THE ENGINEERING AND MINING JOURNAL

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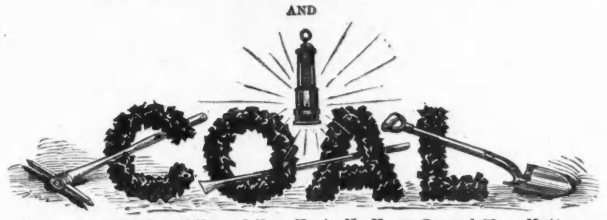

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RICHARD P. ROTHWELL, C.E., M.E., ROSSITER W. RAYMOND, Ph.D., } Editors.

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MR. J. S. PHILLIPS, mining engineer, has left for Brisbane, Sydney, Melbourne, and Adelaide, Australia, on professional business, and will be prepared to introduce American mining machinery in Australia. His address will be Adelaide, South Australia.

WE are indebted to Prof. GILBERT E. BAILEY for a copy of the Rapid City (Dakota) *Republican* Supplement of August 20th, 1885, containing his oration, delivered the day before, at the laying of the corner-stone, in that city, of the new Territorial School of Mines. A modest beginning has been made in the appropriation of $10,000 for a building and $7500 for the maintenance of the school; but it is hoped that out of this beginning a well-endowed and thoroughly furnished institution will grow. Professor BAILEY'S oration is a vigorous attack upon "classical education" as a preparation for practical life; an equally vigorous advocacy of practical scientific training; and an appropriate pæan over the mineral treasures of Dakota. With regard to the tin of the territory (after bringing in HOMER'S description of ACHILLES'S shield—and thus showing a sneaking fondness for the classics, after all), the Professor makes a good point, thus:

> "When a metal so well known and so necessary to the world has been thrown out of the sluice-boxes and tossed upon the dump for ten years in one district without any one suspecting its presence, it is rather late to argue that it is too early to talk of schools of mines. It looks as if the contrary were true, and that, in laying this stone to-day, we are but realizing that 'it is better late than never.'"

But he is a little at fault in his statement that "the first one hundred pounds of tin ever made in the United States from American ore was made by E. N. RIOTTE, of New York, from ore taken from the Etta tin mine."

We have a strong impression that more than a hundred pounds of tin were smelted from the ores of the Temescal range, in Southern California, years ago. Certainly, a considerable number of articles made from that tin were exhibited; and we have in our possession specimens of the ore and bars of the metal from it. But if the aggregate was more than a hundred pounds, it was not so much more as to cause Professor BAILEY special uneasiness. The main point is, that the mines of Southern California are not producing any tin now. Let Dakota give us a good record of practical output; and fame will not hesitate between the Black Hills and the Pacific. We mean the particular fame which waits upon tin mines. *

THE EVOLUTION OF A CAVE.

One after another, the cherished illusions of our youthful days are dissipated, and our childish faith in authorities fades away under the naked light of truth. DARWIN long ago uprooted many of these early illusions, and by the simple laws of evolution and the survival of the fittest has dispensed with the miracles that were dragged in at every step to explain whatever the stupidity of man failed to understand. But a few years ago, seismic revolutions and volcanoes were introduced to account for most of the curious or obscure phenomena of geology and mineral veins, and even for the formation of coal; but as more light is thrown upon obscure subjects, and as knowledge increases, the domain of the miraculous diminishes and the mysterious finds a simple explanation.

One would have supposed that the thoughtful geologist, who has seen so many of these dear delusions uprooted in recent years, would have learned a broad and forbearing charity toward those who differ from him in the explanation of natural phenomena, and that prudence would have led him carefully to examine easily accessible natural objects upon which opposing theories were founded before contradicting them, and still more before promulgating theories inconsistent with apparent facts. Charity and prudence, however, are not always associated with the study of geology; nor have the mists of the miraculous everywhere been penetrated by the sun of knowledge.

A curious illustration of these several points has been given in the case of the discussion concerning the origin of the so-called Fingal's Cave, in the Island of Staffa, on the west coast of Scotland.

Every reader of geological text-books is familiar with the "picture" of the famous Fingal's Cave, which we were told was excavated in columnar basalt by the action of the waves. A few years ago, an American gentleman, Mr. COPE WHITEHOUSE, who appears to have a mission (*vulgus*, a hobby) for exploding traditions, visited Staffa and found abundant evidences that Fingal's and a number of other less known caves that are situated on every side of the Island of Staffa are artificial, the handiwork of man; and that their excavation by the waves was not only impossible, but the evidences of its impossibility are palpable and such as should have prevented any observing person, not to say geologist, from falling into the error, indorsed, circulated, and defended by no less an authority than the Scotch geologist Dr. ARCHIBALD GEIKIE, Director-General of the Geological Survey of Great Britain, and formerly Director of the Geological Survey of Scotland.

The very name of the cave has been corrupted from UAIMH BINN, or the *cave of noise*, to Fingal's Cave; and more surprising yet, the illustrations published by Professor GEIKIE in the successive editions of his Elementary Geology, and in many geological text-books by other well-known geologists, bear no resemblance to the Island of Staffa or to the cave as it exists, nor even to each other. Yet, when Mr. COPE WHITEHOUSE pointed out these discrepancies and errors, his communications were treated with derision by the geological section of the British Association, in 1881–82–83. In the last edition of his geological text-book, recently issued by Macmillans, Professor GEIKIE, unable to withstand the proofs of the errors in the previous editions of his book, and apparently unwilling to make the frank and generous acknowledgment of his indebtedness to

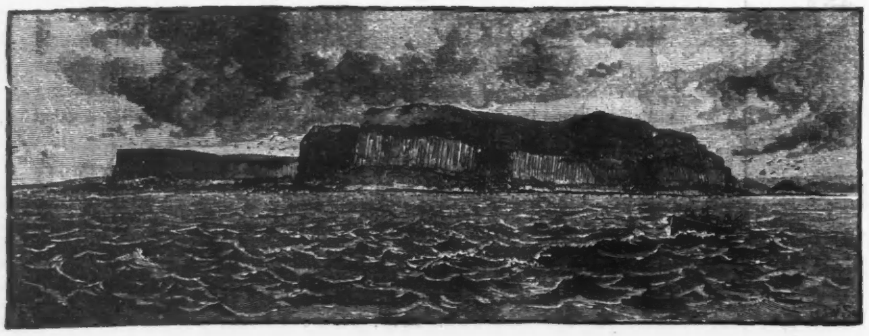

Fig. 3.—Staffa, from a Photograph (Cope Whitehouse, 1884).

Fig. 2.—Island of Staffa, according to Sir Joseph Banks, 1772.

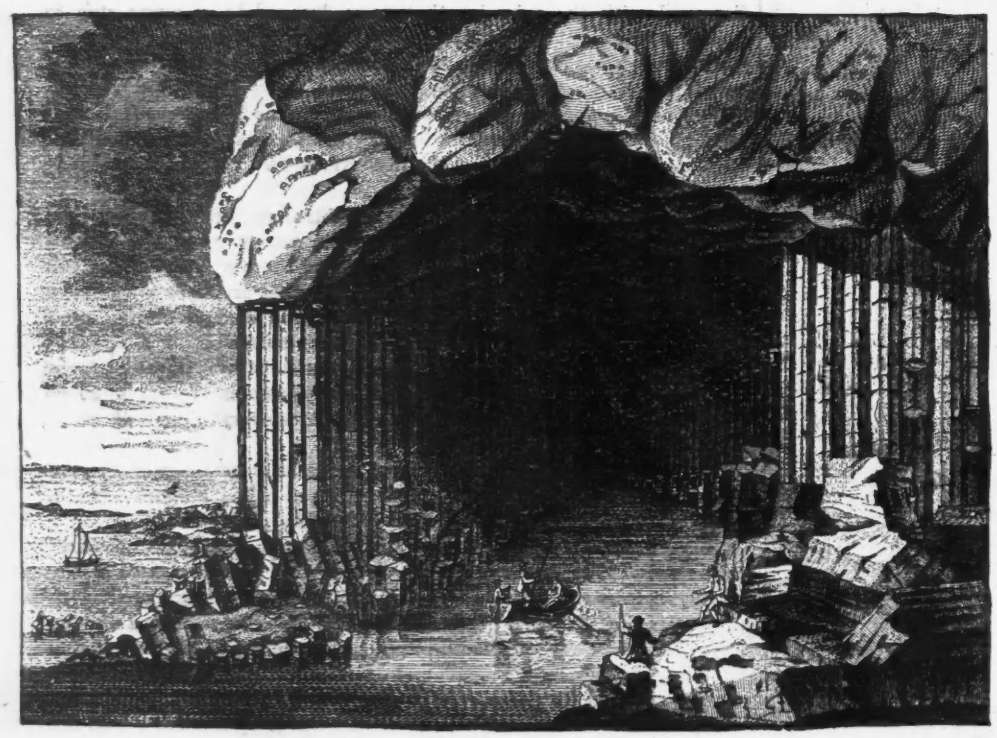

Fig. 4.—Fingal's Cave, Staffa.

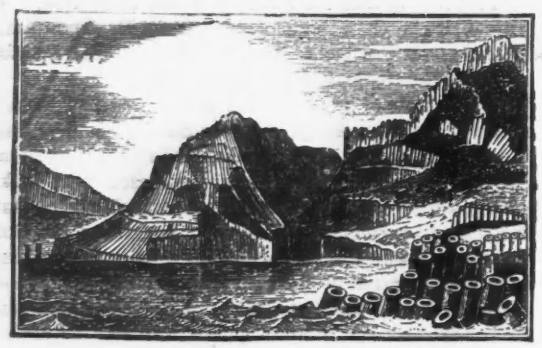

Fig. 8.—Fingal's Cave, Staffa

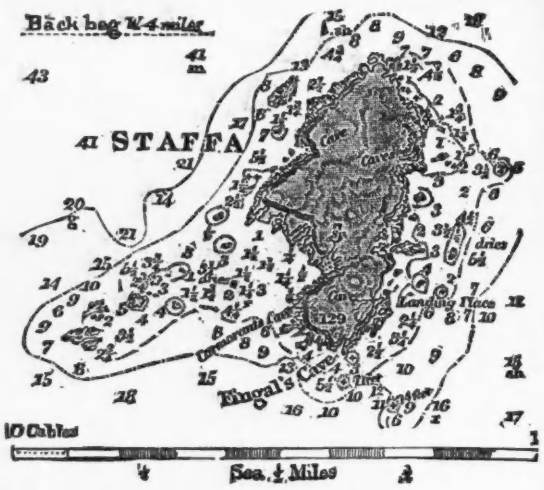

Fig. 1.—From the Admiralty Chart of Loch Tuadh.

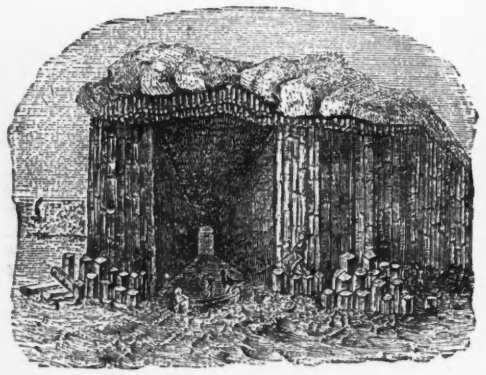

Fig. 7.—Fingalshoehle auf Staffa.

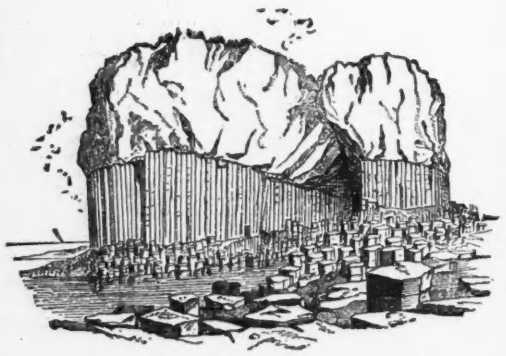

Fig. 10.—Columnar Basalt of Fingal's Cave, Staffa (Macculloch). Archibald Geikie, LL.D., 1882.

Fig. 9.—The Island of Staffa, with Fingal's Cave. Archibald Geikie, LL.D., 1881.

Mr. COPE WHITEHOUSE that one would expect under the circumstances, has crawled out of the difficulty by simply suppressing Staffa and Fingal's Cave altogether, and withdrawing from public admiration our old, familiar, and dearly cherished myth, giving us nothing in its place.

The marvel of our youth, and one of the most attractive of "natural" phenomena, is about to disappear from geological text-books, and though it may still linger with other exploded myths in the pages of so-called "popular science" books, we may briefly trace the evolutions through which this cave and the whole island have gone (in geological text-books) since 1772, when they were accurately described and illustrated by Sir JOSEPH BANKS. Fig. 1 is a copy of the Admiralty chart, showing the Island of Staffa and the position of a number of caves situated on every side of the island, as the island is landlocked, except for a short space facing the west. Fig. 2 shows Staffa as depicted by Sir JOSEPH BANKS in 1772, with the dimensions of four of its caves as follows: Cormorant's Cave, 224 feet long by 48 feet wide; Boat Cave 150 feet by 12½ feet; Fingal's Cave, 227 feet by 42 feet; Clamshell Cave, 130 feet by 16 feet. BANKS supposed these caves were excavated by the sea, because the sea makes caves, and surges roll with considerable force against Staffa. After his return to London, he gave to PENNANT copper-plate engravings admirably executed from the original sketches of his draftsman, and the scientific world was thenceforward in the possession of all the material facts, subject to two errors. Both of these were speedily corrected. FAUJAS ST. FOND, a French geologist, and member of the French Academy, pointed out a mistake by which *débris* seemed to have fallen near the mouth of Fingal's Cave. MACCULLOCH gave the correct name and its translation. The hight of the island is 129 feet.

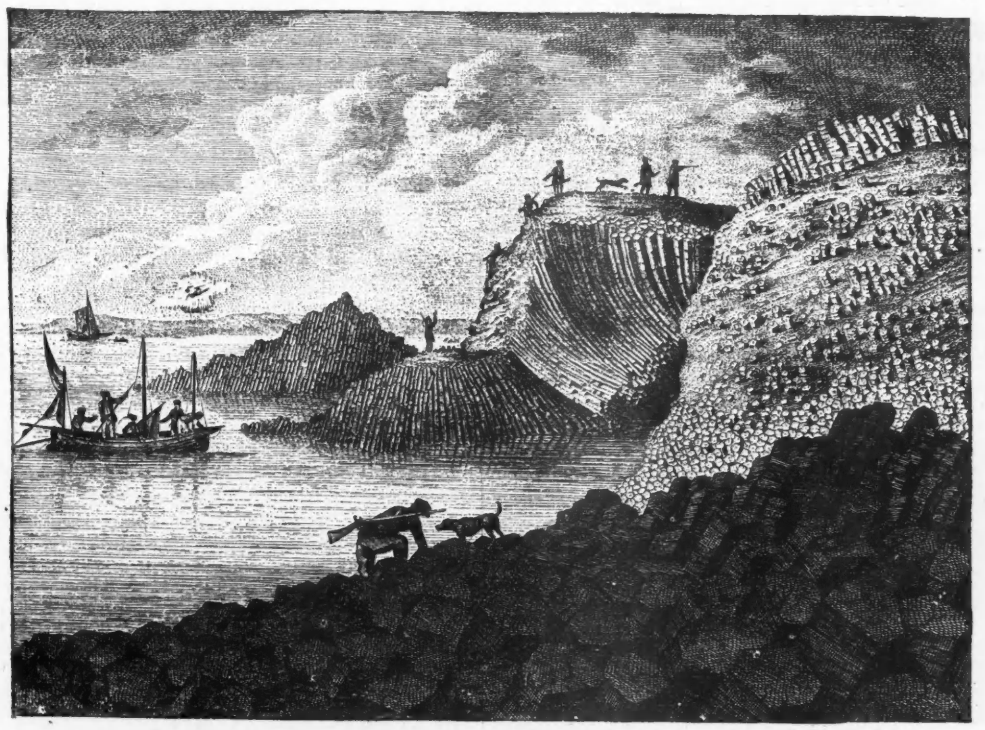

Fig. 6.—Isle of Boo-Sha-La and Bending Pillars opposite to it. Clamshell Cave.

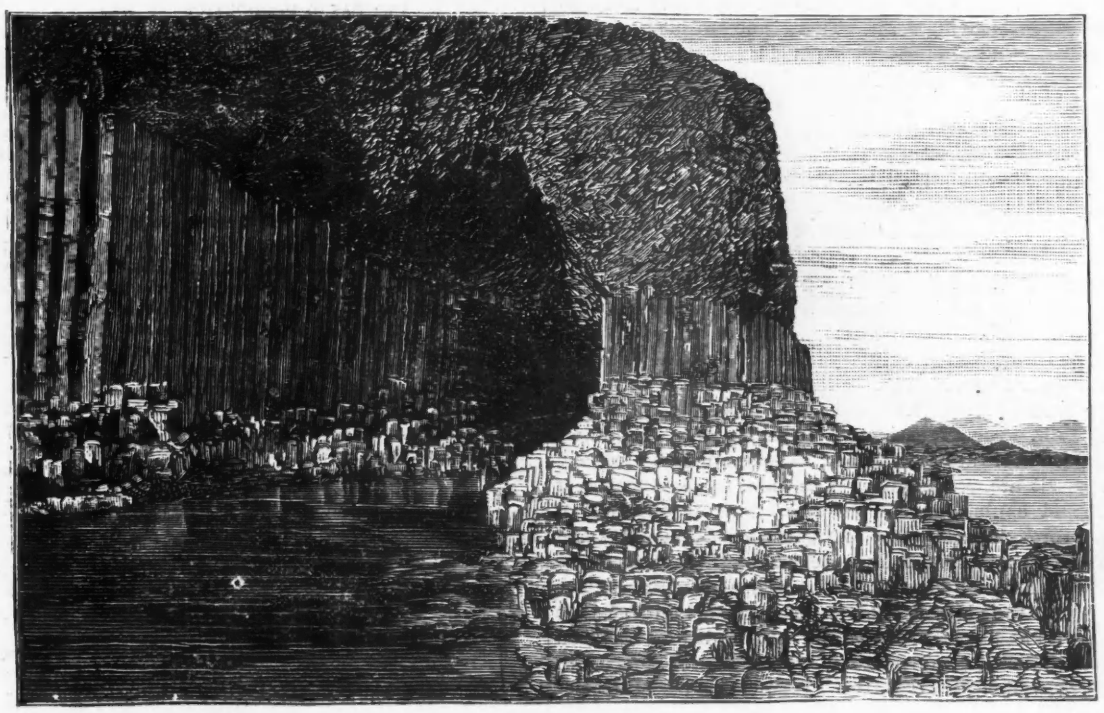

Fig. 5.—Uaimh-Binn or Fingal's Cave.

The picture of Staffa is in all respects admirable, as may be seen by comparing BANKS'S picture, Fig. 2, with COPE WHITEHOUSE'S illustration, engraved from a photograph, Fig. 3. There are seven caves in Staffa, and Uaimh Binn (Fingal's) is but little larger than some of the others. Fig. 4 is BANKS'S illustration, and its dimensions, as given

on the original manuscript chart, by E. J. BEDFORD, 1857, at the Admiralty in London, are as follows:

From East H. W. point to the head	288 feet.
Span of arch " " "	212 "
Hight of arch above high water	59 "
Breadth of cave under arch	33 "
General depth to the head	24 "

Other authorities give the width as 37·3, 42, and 53·7 feet, probably measured at different points. This illustration (Fig. 4), when compared with a photograph, is seen to be very accurate, except a little *débris* shown on the right-hand side, which does not exist in fact. *Fig. 5 shows the cave as it is.* From these illustrations and Fig. 6, the Island of Boo-sha-la, with Clamshell Cave, combined in some mysterious scientific manner, the geologists have evolved the wonderful creations shown in Figures 7, 8, 9, and 10.

Fig. 7. This was evolved with true German science from the geologist's inner consciousness. The end was taken out of the cave as unnecessary for science, and the sides were dressed to mathematical lines.

Fig. 8, from HITCHCOCK'S Elementary Geology, is introduced thus: "Fingal's Cave, in the Island of Staffa (one of the Western Islands of Scotland), and the Giant's Causeway, in the north of Ireland, are almost too well known to need description. Staffa is composed entirely of basalt with a thin soil, and its shores are for the most part a steep cliff, 70 feet high, formed of columns. The cave is a chasm (in these columns) 42 feet wide and 227 feet long, formed by the action of the waves. The following sketch will convey an idea of the situation of the cave and of the general structure of the island."

This was improved from MANTELL'S *Wonders of Geology*, which used Clamshell Cave for Fingal's Cave, and Dr. HITCHCOCK converted the basaltic columns into cast-iron pipes (Fig. 8), and introduced other novelties and improvements not found elsewhere, and then credited them to nature and the action of the waves. Probably the foreign authors had not seen the island or the caves, so this is some explanation, if no excuse, for their absurdities; but Dr. GEIKIE, in 1881, gave the illustration, Fig. 9, and in 1882, Fig. 10, as the Island of Staffa with Fingal's Cave. The evolution is complete. The product of the educated imagination of the scientific geologist could do but little more except to ascribe the work to nature and ridicule the American layman who pointed out the absurdity, and gave the following, among other reasons, showing that the caves are artificial, made by man, and could not have been formed by the action of the waves:

"The rarity of caves in Scotland is an established fact (RAMSAY). There are seven caves in Staffa. They are on all sides of the island. They are sudden interruptions of a shelving coast. There is no erosion or excavation in the western exposed tuff cliff. Two caves are on the eastern side and face Mull. Fingal's Cave, Boat Cave, and Cormorant's Cave are opposite to Iona. Each cave is protected by a natural breakwater. No cave has a southwestern axis. There is no excavation in the finely columnar basalt except above Fingal's Cave. There is no erosion or yielding of roof in the columnar basalt above Cormorant's or Boat Cave. Columnar basalt under the action of the sea tends to form a causeway, not a cave. There is a tympanum or hooded doorway to Cormorant's and Fingal's Cave; none to Boat Cave. Long sea caves rarely have the entrance higher than the interior; for example, Blue Grotto. The two larger perforations are in horizontally homogeneous but perpendicularly different rock. The greatest width of Fingal's Cave is in the columnar basalt above the ordinary wash of the sea. Fingal's Cave is in tuff, columnar and confused basalt. Cormorant's Cave is in tuff and columnar basalt. Boat Cave is in tuff. Clamshell Cave is in curved columnar basalt. The dimensions of these four caves show two distinct sizes. The sea floors are rectangular. The entrances in tuff and curved columnar basalt are rectangular. The three southern caves, if erosions in tuff, should exhibit curved surfaces. Narrow channels of uniform depth lead through shoal water to the end of Cormorant's and Fingal's Cave. There are no corresponding crevices on the surface of the island. The *débris* has entirely disappeared from the excavations. The material taken away is about 150,000 cubic yards. The columnar basalt is easily removed by human agency, but would not readily be reduced to shingle. A force sufficient to pulverize it would destroy the island, especially the eastern wall of Fingal's Cave. There is no bar or deposit of gravel in front of the caves. The Island of Staffa is protected by its own foreshore. Staffa is in the center of a circle almost closed by land. The rocks and shoals between Iona and Black Beg break the Atlantic surges. The tides meet to the south. The limited force of the breakers is shown by the island itself in its different parts.

"The disturbing agency of man might find an explanation in the position of Iona, its maritime and political importance, its ancient pre-Roman civilization, and mediæval lordship of the isles. The strategic importance of Staffa, and the occasional use of its excavations as harbors, seem to be confirmed by the loose granite (not erratic) blocks on its summit and near the landing place, the vitrified basalt at Dun-Staff-nage, and the otherwise inexplicable fact that 'nothing but an accident of geography connects the names of Staffa and Iona' (Duke of ARGYLL), although the axis of Fingal's Cave centers the Dun of Hy."

CORRESPONDENCE.

[We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.]

Water-Jacket Furnaces.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of the 22d of August, you speak of Balbach's Works, at Newark, New Jersey, in 1873, as being the probable place and time of the first use of the water-jacket. About the year 1865, the father of the writer, Mr. John Williams, then manager of the Portage Lake Smelting Works, at Houghton, Lake Superior, erected a number of water-jacket cupola or blast-furnaces for experimental smelting of the Calumet ores, and these furnaces are the first erected to my knowledge. If there are records of any earlier water-jackets, I should be interested to learn of them.

J. J. WILLIAMS.

SAN FRANCISCO, CAL., August 31.

The Bricking of Fine Ore.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In response to Mr. Church's questions in a late issue of the JOURNAL, regarding the bricking of fine ore as a preparation for blast-furnace smelting, I desire to say that my own appeal to the public for information on that head was made only after having tried every feasible method that I could think of, and still being dissatisfied with my results as applied to the particular class of material to which I referred. The importance of this subject was forced on my attention at a very early period of my professional life, and has since been an object of frequent and extensive experiments. I am also aware that Mr. Church has had experience in the matter, and hope he will make the details public. As this subject is to find a place in a future chapter of my treatise on Metallurgy, now appearing in your columns, I will not anticipate at this time.

DORCHESTER, MASS., Sept. 4. EDWARD D. PETERS, JR.

CLEAR CREEK COUNTY, COLORADO, NOTES.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: There is no "boom" here. There never will be. Our camps have passed the booming stage of development, and little that is exciting can be narrated, if the narrator confines himself to the truth. Our mines have not the phenomenal characteristics of those at Aspen; but for steadiness of production will compare favorably with any in the older and better known districts. It is thought by many, that the production of silver and gold in this county, during the current year, will not fall far short of three million dollars. I do not know how close this estimate may be; but a large amount of good ore is certainly shipping from Georgetown; and other parts of the county are reported to be doing quite as well, proportionately.

INCREASED PRODUCTION OF SILVER-LEAD ORES.

The high price at which lead has ruled for some time past will, in a short time, have an important influence on the production of silver. But so far, this influence has been so slight as to be almost imperceptible, as regards shipments from mines in this immediate vicinity.

Attention is now directed to mines that produce ores rich in lead, but that run low in silver. Shipments of this character from mines that have been idle for a long time will soon be made. As long as the price of lead remains above four cents a pound, these shipments will continue. Auriferous iron pyrites are also in demand.

THE HIGH PRICE PAID FOR ORE.

For buddled stamp-mill tailings that do not carry more than 15 per cent of silica, the smelters now pay the full assay value in gold and silver, less only ten dollars a ton. Tailings are to be delivered on board the cars at Georgetown or Empire. The freight from here to Denver is $4 a ton, which is paid by the smelters, making the net cost to them within $6 a ton of the assay value. The price above quoted is the best ever paid here for this class of material.

For dry silver ores, the smelters pay, in Georgetown, from 91 to 95 per cent of the gold and silver contents, less from $18 to $20 a ton, according to the character of the ore; that is, according to its richness and the percentage of zinc present. They pay much better prices for lead ores, but I do not know the exact figures. While these prices are better than have been paid heretofore, except for a short time last year, our miners are not altogether satisfied. They want more, and, I think, are justified in asking it.

The high price paid for buddled tailings will lead to the reopening of quite a number of gold mines that have been idle for years. It will also lead mill-men to look more carefully into the subject of concentration.

CONCENTRATION AND CONCENTRATORS.

A few days ago, I visited a gold mill, where the owners were crushing fifteen tons of ore in twenty-four hours. From the copper plates, the tailings passed over blankets; then into a small two-compartment jig, which produced one ton of concentrates, worth from $50 to $60, every twenty-four hours. I went below the mill, and caught two panfuls of tailings, at the point where the launder empties into the creek. Concentrated at the rate of fifteen tons into one, the concentrates assayed $71.50 a ton in gold and silver. Better work can be done by machinery than I did with the pan. I came to the conclusion that the mill was losing at least $60 a day, which could be saved with little trouble. I do not wish to have it understood that the mill-men are at all satisfied with the work they are doing, or that they will continue to suffer this loss. They have stopped a good many leaks already, and intend to stop them all.

The Stanton Engineering Company has recently overhauled the old Farwell mill, and put in two Golden Gate concentrators. The company is running on Colorado Central ore at present. No information is given to the public; but I am promised full particulars when the run is completed, and will send you the figures, if I am allowed to do so.

The Terrible mill, at Brownville, belonging to the Colorado United

Mining Company, is running on material taken from old stulls, where the ground was worked out some years ago. The material is said to be excellent, and the mill to be paying very handsomely.

WE TOLD YOU SO.

The Big Chief mill, above Empire, is for sale. The personal property belonging to the company is sold as opportunity offers. You now have a chance to say, "I told you so." Had the warning that you gave through the columns of the ENGINEERING AND MINING JOURNAL been heeded, a good many thousands of dollars might have been saved. I do not, at the present moment, remember the exact name of the company owning this mill, but think it is the New York & Colorado Mining and Milling Company. There is a company with a name somewhat similar operating at Central. But I am informed that there is no connection between the two. The mill is a good one—one of the best in the county; but there is no reason for its existence where it was placed.

I began this letter with the intention of telling you something about the mines of Clear Creek County. I find, on looking it over, that I have barely mentioned them. I will try you with this as it is. If you do not rebel, I will send you something about the *mines* next week. H. F.

GEORGETOWN, COLO., August 30.

THE MINERAL PRODUCTION OF NOVA SCOTIA.

The following tables summarize the importance of the mineral output of Nova Scotia, to which the attention of the members of the American Institute of Mining Engineers is to be directed, at the meeting in Halifax next week.

The following shows the mineral production of Nova Scotia, from 1879 to 1884:

		1879.	1880.	1881.	1882.	1883.	1884.
Gold	Ounces.	13,801	13,234	10,756	14,107	15,446	16,079
Iron ore	Tons	29,889	51,193	39,843	42,135	52,410	54,885
Manganese ore	"	145	223	231	205	150	302
Copper	"	.....	.....	.....	.....	60	110
Lead	"	.....	.....	.....	.....	.....	100
Antimony	"	.....	.....	.....	.....	.....	600
*Coal raised	"	788,273	1,032,710	1,124,270	1,365,811	1,422,553	1,389,295
†Gypsum	"	95,126	128,528	107,133	133,426	144,668	111,068
†Building-stone	"	5,562	3,540	6,638	4,357	181	780
Coke made	"	9,646	13,125	27,871	26,731	44,189	40,085
Limestone	"	9,444	.....	.....	16,584	26,477	25,567
†Grindstones	"	1,675	1,500	1,680	2,450	155	2,200
Barytes	"	480	.....	40	.....	.....	.....
Fire-clay	"	50	75	401	.....	.....	.....

GOLD—GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of gold extracted.	Stuff crushed.	Yield per ton of 2000 lbs.	Total days' labor.	Average earnings per man per day and year, at 300 working days, $18 an ounce.	
	Oz. Dwt. Gr.	Tons.	Oz. Dwt. Gr.		A day.	A year.
1862	7,275	6,473	1 2 11	156,000	$ 83	$249
1863	14,001 14 17	17,002	16 11	273,264	.92	276
1864	20,022 18 13	21,434	18 16	252,720	1.42	426
1865	25,454 4 8	24,423	1 0 20	212,966	2.15	645
1866	25,204 13 2	32,161	15 2	211,796	2.14	642
1867	27,314 11 11	31,386	17 9	218,894	2.24	672
1868	20,541 6 10	32,262	12 17	241,462	1.53	459
1869	17,868 0 19	35,147	10 4	210,938	1.52	456
1870	19,866 5 5	30,829	12 21	173,680	2.05	615
1871	19,227 7 4	30,791	12 11	162,392	2.12	636
1872	13,094 17 6	17,093	15 7	112,476	2.09	627
1873	11,852 7 19	17,708	13 9	93,570	2.28	684
1874	9,140 13 9	13,844	13 5	77,246	2.12	636
1875	11,208 14 19	14,810	15 4	91,698	2.20	660
1876	12,038 13 18	15,490	15 13	111,304	1.94	582
1877	16,882 6 1	17,369	19 10	123,565	2.46	738
1878	12,577 1 22	17,990	13 23	110,422	2.05	615
1879	12,801 8 10	15,936	17 8	92,002	2.34	702
1880	13,234 0 4	14,037	18 20	103,826	2.18	654
1881	10,756 13 2	15,556	12 20	126,308	1.52	456
1882	14,107 3 20	22,081	12 18	106 884	2.37	711
1883	15,446 9 23	25,954	10 21	97,733	2.84	862
1884	16,059 18 17	25,147	12 18	118,087	2.40	720
Total	366,976 11 19	495,923	.....	3,480,193	.....	.....

GOLD—GENERAL STATEMENT FOR THE YEAR 1884.

Showing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, etc., for the year ended December 31st, 1884.

DISTRICTS.	Number of mines.	Days' labor.	Mills employed.	Tons of quartz, etc., crushed.	Yield per ton.			Total yield of gold.			Average yield per man per day for twelve months at $18 per ounce.
					Oz.	Dwt.	Gr.	Oz.	Dwt.	Gr.	
Caribou	3	7,499	2	1,559	0	12	9	966	19	22	2·32
Darr's Hill	1	24,935	1	9,799	0	6	20	3,397	0	0	2·45
Fifteen-Mile Stream	1	1,573	1	107	0	16	13	88	14	3	1·00
Montague	2	4,469	2	539	1	7	8	736	12	23	2·60
Oldham	2	3,011	2	921	0	17	21	824	15	12	4·80
Renfrew	1	3,170	1	1,679	0	6	18	569	18	0	3·20
Sherbrooke	8	22,142	2	3,268	0	16	7	2,668	11	0	2·10
Stormont	1	7,337	1	913	2	8	10	2,212	8	1	5·40
Tangier	1	13,589	2	1,330	0	14	0	924	2	19	1·10
Uniacke	2	4,898	4	2,235	0	10	4	1,140	6	2	4·20
Waverly	1	344	2	10	1	7	0	1	7	0	....
Unproclaimed, etc.	4	25,120	7	2,826	0	18	0	2,548	19	0	1·80
Total	27	118,087	27	25,186	0	12	18	16,079	14	10	2·40

* Tons of 2240 pounds. † Amounts exported. Home consumption unknown.

MINES REPORT.

NOVA SCOTIA COAL SALES, FROM 1785 TO 1884 (INCLUSIVE).

Year.	Total sales.	Year.	Total sales.	COAL EXPORTED TO THE UNITED STATES. Tons.
1785	1,668	1841	148,298	.....
1786	2,000	1842	129,708	.....
1787		1843	165,161	.....
1788	10,681	1844	108,482	.....
1789		1845	150,674	.....
1790		1846	147,506	.....
1791	2,670	1847	201,650	.....
1792	2,143	1848	187,043	.....
1793	1,926	1849	174,592	.....
1794	4,405	1850	180,084	118,173
1795	5,320	1851	153,499	116,274
1796	5,249	1852	189,076	87,542
1797	6,039	1853	217,426	120,764
1798	5,948	1854	234,312	139,125
1799	8,947	1855	238,215	103,222
1800	8,401	1856	253,492	126,152
1801	5,775	1857	294,198	123,335
1802	7,769	1858	246,725	186,743
1803	6,601	1859	270,293	122,720
1804	5,976	1860	323,593	149,289
1805	10,130	1861	326,429	204,457
1806	4,938	1862	395,637	192,612
1807	5,119	1863	429,351	282,775
1808	6,616	1864	576,935	347,594
1809	8,919	1865	635,586	465,194
1810	8,609	1866	558,570	404,252
1811	8,516	1867	471,185	338,492
1812	9,570	1868	453,694	228,132
1813	9,744	1869	511,795	257,485
1814	9,866	1870	568,277	168,180
1815	9,336	1871	596,418	165,431
1816	8,619	1872	785,914	154,092
1817	9,284	1873	881,106	264,760
1818	7,920	1874	749,127	138,335
1819	8,692	1875	706,795	89,746
1820	9,980	1876	634,207	71,634
1821	11,388	1877	697,065	118,216
1822	7,512	1878	693,511	88,495
1823		1879	688,628	51,641
1824	27,000	1880	954,659	123,423
1825		1881	1,035,014	113,728
1826	12,600	1882	1,250,179	99,302
1827	12,149	1883	1,297,523	102,755
1828	20,967	1884	1,261,650	64,515
1829	21,935			
1830	27,269	Total	22,290,937	
1831	37,170			
1832	50,396			
1833	64,743			
1834	50,813			
1835	56,434			
1836	107,593			
1837	118,942			
1838	106,730			
1839	145,962			
1840	101,198			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably underestimated.

Duty 24 per cent *ad valorem* from 1850 to 1853 inclusive. Free from 1854 to 1866; $1.25 per ton from 1867 to 1871; 75 cents per ton from 1872 to present time.

The Preservation of Copper Sheathing.—M. Carnot, in the *Bulletin de la Société pour l'Encouragement de l'Industrie Nationale*, reports, on behalf of the committee on chemical arts, that a small quantity of metallic manganese, as an alloy containing 75 per cent of copper and 25 per cent of manganese, prevents the formation of cuprous oxide, which is the cause of the formation of soluble salts, which accelerate the corrosion of sheet-copper employed for the sheathing of ships. By this method, the durability of copper exposed to the action of sea water is greatly increased.

Steel Rail Contracts.—The Königliche Eisenbahn direction at Bromberg lately sought tenders for 60,000 meters of steel rails. Both Upper Silesian works tendered the very lowest prices, the Oberschlesische Bedarfsgesellschaft offering 138·50 marks, and the Vereinigte Königs- und Laurahütte 139·50 marks per 1000 kg. from station. The Rhenish Westphalian works asked considerably higher prices; Krupp, of Essen, 142 marks; the Dortmund Union, 143 marks; Bochum, 144 marks; Hörde, 143·50 marks, etc. The tenders of the Upper Silesian works are this time much lower than in most preceding contracts. In September last, the same works asked 145 marks in tenders sent in to the Berlin railroad administration, while in a second tender sent in last October the Laurahütte asked 145 marks and the Bedarfsgesellschaft 146 marks. In April of the present year, there was another contract for rails at Berlin, the Vereinigte Königs- und Laurahütte asking 140 marks, while the Bedarfsgesellschaft did not tender.

Black Enamel for Iron Goods.—For the last few years, says the *Génie Civil*, many efforts have been made by different processes and various materials to protect iron and give it a brilliant black coating. Recently M. Puscher, of Nürnberg, has described a very simple process whereby he claims to cover iron with a black coating similar to enamel, and very much more evenly and regularly distributed, as it is not laid upon the metal with a brush or any similar tool. M. Puscher places in a vessel about 18 inches high sufficient finely powdered coal to cover the bottom to the depth of about ¾ inch, and over this at a hight of about one inch is placed a grating, which carries the objects to be treated. The vessel is then covered and luted down tightly, and placed upon a brisk fire. The vessel is at once filled with steam, which soon evaporates, and is then charged with bituminous vapor. The firing is kept up for about half an hour, so that the bottom of the vessel is dull red; after which, it is removed, and, when cool, opened. The residue of the coal is found in the form of coke, and the objects placed upon the grating, which have been at a fairly high temperature for a considerable time, are found to be covered with a black coating having all the appearances of enamel, but of extreme tenacity and a considerable degree of elasticity. It is claimed that objects thus treated may be bent and exposed to great variations of temperature without in the least affecting the coating deposited on their surfaces,

MODERN AMERICAN METHODS OF COPPER SMELTING.*

By Edward D. Peters, Jr., M.E., M.D.

CHAPTER VIII.

THE CHEMISTRY OF THE CALCINING PROCESS.

The next stage of the process may be reckoned from the beginning oxidation of the iron of the pyrites, and also of its second atom of sulphur. This is a much less rapid and vigorous process than the preceding, and is attended by the formation of a certain amount of sulphuric acid, in addition to the sulphurous acid, which is still generated in large quantities. The means by which the former acid was produced was not clearly understood until Plattner's patient and ingenious researches developed the "contact theory," according to which sulphurous acid and the oxygen of the air, in the presence of large quantities of heated quartz, or other neutral material, combine to form sulphuric acid, which may escape invisible, or in the form of white vapors when hydrated, or may in the instant of its formation combine with any strong base that may be present.

In the case under consideration, protoxide of iron (FeO), arising perhaps from the very particle of pyrites whose oxidation gave rise to the sulphuric acid, is at hand; and while the greater proportion of the sulphuric acid formed escapes into the atmosphere, a certain amount combines with the protoxide of iron, to form ferrous sulphate, whose presence may easily be detected, owing to its solubility in water.

From the very commencement of the formation of sulphuric acid, a new and powerful oxidizing agent is gained, as the protosulphate of iron is easily broken up by heat. The decomposition of its acid into SO_2 and O promotes the oxidation of other sulphides present to sulphates, while the protoxide of iron is raised to the sesquioxide of that metal—a tolerably stable compound, and one usually found in large quantities in thoroughly roasted pyritic ores. Before the complete decomposition of the ferrous sulphate has occurred, and indeed while some considerable proportion of sulphide of iron may yet remain, an analogous process takes place with the chalcopyrite, its ferruginous portion following almost precisely the same course as the iron pyrites, while its copper contents are transformed into cupric sulphate, which, on the addition of water, becomes copper vitriol, easily recognized by its color and by several simple and well-known tests.

As the process continues, and the temperature is gradually raised, this salt also undergoes decomposition, yielding at first a basic sulphate of copper, which, upon losing its acid, becomes a dioxide and eventually a protoxide of that metal. These last changes, however, require a protracted high temperature.

The oxidation of the iron present is pretty well advanced at the time of the maximum formation of cupric sulphate; but it is not until the decomposition of at least 75 per cent of the last-named salt that the formation of sulphate of silver begins with any considerable energy. When once fairly started, however, this interesting and important reaction progresses with great rapidity, and the decomposition of the comparatively large proportion of sulphate of copper present furnishes ample oxidizing influence for the minute quantities of sulphide of silver. The maximum formation of the latter substance usually coincides with the almost entire destruction of the former salt, and it is at this point that the *Ziervogel* calcination should terminate, as any further exposure of the silver salt to heat lessens its solubility in water, and may even threaten its existence. The complete decomposition of the argentic sulphate is only accomplished by a long exposure to a high temperature, which is now easily borne by most ores and mattes, the easily melted sulphides having been converted into almost infusible oxides and basic sulphates.

Galena (sulphide of lead), when present, is converted almost entirely into a sulphate of that metal, which, by a higher temperature, is partially decomposed with the evolution of sulphurous acid and the final production of a mixture of free oxide of lead with sulphate, the proportions of these two substances varying according to the quantity of foreign sulphides present.

Zincblende requires a higher heat for its thorough oxidation than any of the preceding sulphides, but with care may be eventually changed into an oxide, although a certain amount of basic sulphate of zinc nearly always remains. This includes all the sulphides assumed to have been present in the ore under consideration, nor will others be encountered in practice unless under very exceptional circumstances. Sulphide of manganese is an occasional unimportant constituent of mattes, and presents no particular difficulty in calcining, being easily oxidized to a basic sulphate, insoluble in water, which is stable except at the highest roasting temperatures, when it yields up its acid in the shape of SO_2, and remains as a mixture of manganous and manganic oxides.†

The gangue-rock of copper ores, being usually siliceous, undergoes no change and exerts no influence upon the calcining process, except in so far as it assists in the oxidation of sulphurous to sulphuric acid by *contact*, as already mentioned.

Calc-spar loses its carbonic acid and is converted into gypsum (calcium sulphate), while heavy-spar—sulphate of baryta—undergoes no change, except in the presence of a powerful reducing atmosphere and at a high temperature, when it may be changed into sulphide of barium. This is soluble in water, and it has been suggested to use its solubility to remove it when its presence is particularly objectionable. A number of trials in this direction were made by the author in 1872 on the heavy-spar ores of Mount Lincoln, Colorado, with very poor results; as it was found extremely difficult to reduce the barium sulphate to sulphide without mixing an amount of coal-dust with the ore at least equal to the weight of the heavy-spar present—from 30 to 40 per cent—while the BaS formed at this high temperature is only partially soluble in water.

Arsenic and antimony, when present, are usually combined with some metallic base, and behave like sulphur to a certain extent; but they give off a much smaller proportion as volatile, antimonious, and arsenious acids, while they combine to a much greater extent with the metallic bases, forming salts difficult to decompose and extremely injurious to the quality of the copper.

Under such circumstances, the roasting should be continued in the usual manner until all the sulphides present are oxidized and the resulting sulphates forthe most part decomposed. At this stage, from 4 to 6 per cent of charcoal dust or fine bituminous or anthracite coal-screenings should be thrown upon the charge and thoroughly incorporated with it by vigorous stirring, the heat at the same time being raised to the highest practicable limits. The antimonates and arsenates of iron and copper are rapidly reduced by this means, and a considerable proportion of the injurious metalloids are volatilized, much to the benefit of the resulting copper. The charge should remain in the furnace until all the incorporated carbon is consumed.

In the foregoing description, the process of calcination has been carried much farther than is generally needed, or even desired, in an ordinary oxidizing-roasting as a preliminary to fusion.

Sufficient sulphur must always be present in the smelting mixture to prevent the formation of too rich a matte, which entails heavy losses in metal and other injurious consequences. But it is not a simple matter to determine in advance exactly the amount of sulphur necessary to produce a matte of any given grade. This depends not only upon the character of the furnace process to be employed—that is, whether blast or reverberatory—but also to a considerable extent upon the manner in which the residual sulphur is combined with the bases present; upon the rapidity of the fusion; the quality of the fuel; the volume and pressure of the blast; character of the gangue and flux; and numerous other factors. Whatever may be the condition of affairs, however, it may be pretty safely predicted that the percentage of the resulting matte in copper will almost invariably be very considerably lower than is either expected or desired, so that there is little danger that the calcining department of any newly constructed plant will have too great a capacity in proportion to the rest of the establishment, and many serious errors and disappointments can be traced directly to this habit of overestimating the probable quality of the matte and failing to provide sufficient calcining appliances.

In case of calcination previous to smelting in reverberatories, it is well to avoid an excess of air toward the close of the roasting process; a precaution easily effected by closing the working openings as far as possible, the rabble passing through a hole in the center of a divided door, while the passage of any considerable proportion of undecomposed air through the grate is rendered unlikely by the lively fire that belongs to this period. By these precautions, the oxidation of any large proportion of the iron present to a sesquioxide is prevented, the latter being infusible and unfit to enter the slag until it is reduced to a protoxide. This reduction takes place instantaneously in the powerful carbonic oxide atmosphere that prevails in the blast-furnace; but in the almost neutral atmosphere of the ordinary reverberatory, the sulphur alone plays the part of a reducing agent, and a charge composed of the sesquioxide of iron will be found materially to delay the process of fusion, besides producing a thick and foul scoria. The natural remedy is the admixture of a few per cent of fine coal stirred thoroughly into the mass of the ore, and fired on vigorously.

An examination of the preceding analyses shows what a large proportion of the sulphur in the charge will go into the matte, especially in the case of rapid smelting in blast-furnaces.

Some kind of an idea may be obtained of the probable composition of the matte to be produced at any given time by the ordinary "matte fusion assay," as given in all works on assaying, wherein the ore to be tested is rapidly melted with merely enough borax and siliceous flux—say 100 per cent of borax and an equal amount of pulverized window-glass—to flux its earthy constituents, some 10 per cent of argols or other reducing agent being also added.

But the results are far from satisfactory, and after patiently using it for some two years, and being oftener misled than guided by its results, I discarded it completely, and trusted principally to the eye, occasionally aided by the following calculation, which gives better results than any other familiar to me:

Taking the contents of copper in the charge as a standard for comparison, sufficient sulphur should be allotted to it to form a subsulphide, the excess of sulphur still remaining being supplied with sufficient iron to form a monosulphide of that metal. If other metals are present, such as lead, zinc, or manganese, ¼ of the former, ½ the second, or ¾ the latter substance may be first considered as forming a monosulphide with the sulphur, there being in such a case just so much less of the metalloid left to take up iron. This rule gives quite accurate results in rapid blast-furnace smelting, and where abundance of iron is present. If the rate of smelting be slow, and considerable lime, magnesia, or baryta are present, 5 per cent of the sulphur contents of the charge should be deducted before beginning the calculation; and if the smelting-furnace is a reverberatory, the resulting matte will average 8 per cent higher in copper than found by this formula.

From the foregoing statements, it is evident that in ordinary copper smelting the calculation of sulphide ores need seldom be pushed to the point of perfection indicated when treating of the chemical reactions that take place in the roasting. On the contrary, a due regard for the proper quality of the resulting matte and slag will probably render it advisable to stop the calcining process long before the decomposition of the sulphate of copper in the charge is complete, and even while a considerable proportion of undecomposed sulphides still remains. If, however, the calcination has been carried too far, it is very easy to regulate matters by the addition to the smelting mixture of a very small proportion of raw sulphuret ore.

A glance at the behavior of the various compounds of sulphur and bases is essential for the clear understanding of the much greater richness of the matte resulting from the fusion of any given charge in a reverberatory than in a blast-furnace, and of the importance of having a certain proportion of sulphates and other oxidized compounds in the smelting mixture, in order that they may react on each other in the manner best calculated to eliminate the residual sulphur, and thus in a measure make up for imperfect roasting.

(TO BE CONTINUED.)

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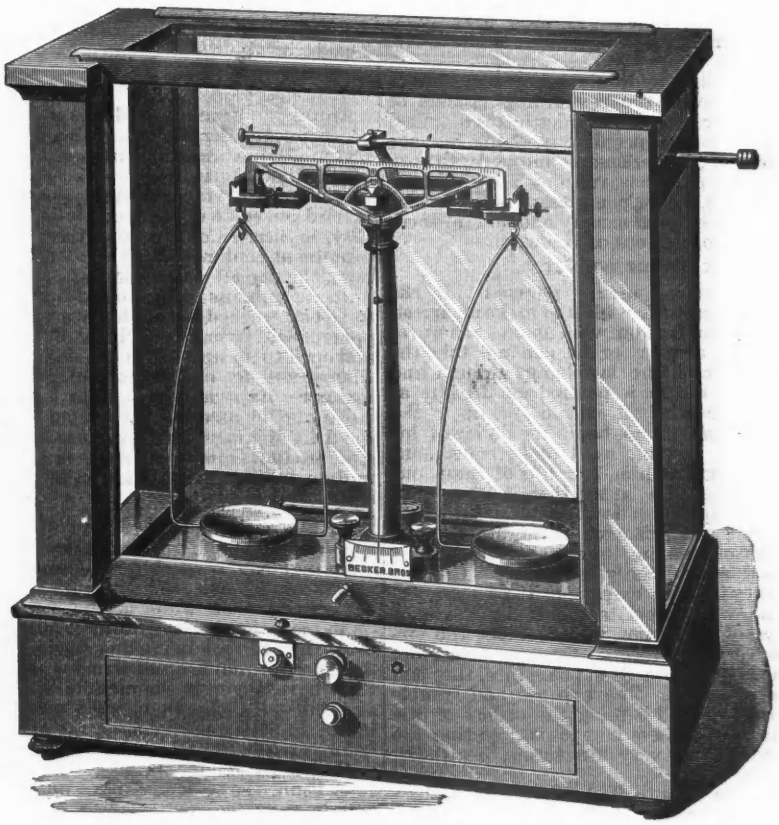
† This reaction of MnS is given in a small pamphlet devoted to the study of the reactions that take place in roasting the Mansfeld copper matte for the extraction of silver by the Ziervogel method; but it is impossible to credit any individual authorities with the statements made in the preceding few paragraphs, they being for the most part matters of general information.

THE BECKER BALANCE.

Every chemist in the country is familiar with the analytical scales made by Messrs. Becker Brothers, of New York. For delicacy and accuracy, they have long held a place among the best in the world; indeed, at the recent New Orleans Exhibition, the firm received no less than six first-class gold medals for analytical balances and weights of precision. "The term 'analytical' has heretofore been applied to indicate special use in analyzing chemicals and ores; but the electrician at present finds almost as many uses for these fine balances as do the chemist and the assayer. For instance, he can determine the weight and specific gravity of carbon filaments for incandescent electric lamps; he can calibrate electrical instruments with great accuracy by weighing the amount of electrolytically deposited metal separated by a unit of current; he can determine the coefficient of electrical resistance of pure copper wire and other metals per unit of weight; he can investigate the effects of magnetism and electricity upon the specific gravity of iron and steel; he can establish the relations existing between the various electrical units and those of weight; in short, he can employ the balance for all those purposes that require either accurate or rough weighing in connection with his laboratory work. As a familiar example of the sensitiveness of these balances, it may be stated that a piece of human hair, one sixteenth of an inch long, was found to weigh, by repeated trials, the 250th part of a grain."

The accompanying illustration shows a new short-beam analytical balance, provided with a newly invented attachment, which is claimed to increase the efficiency and accuracy thirty per cent. By means of the new form of balance, the rider, by which the final minute adjustments are effected, may be manipulated from the outside, in such a manner that it can be moved from the zero-point to either end of the graduated beam by means of a single rod provided with two lifters. The balance is mounted in a French polished mahogany glass case, with front counterpoised sliding frame and glass top to admit of more light on the rider. The bearings and knife-edges are of the finest agate. All parts of the balance are mounted and fastened on plate glass ¼-inch thick, so that nothing can get out of order through warping of the wood.



THE BECKER BALANCE.

COMMERCIAL ELECTROLYSIS.*

By Paget Higgs, LL.D., D.Sc.

By commercial electrolysis, we should, perhaps, generally understand those applications of electrolysis dealt with on a commercial scale. This meaning would not include electroplating and electrotyping, which, although conducted as businesses in extensive works, are really arts. Under this broader view, commercial electrolysis would bring within its scope the refining of copper and of lead, the production of magnesium and aluminium, the preparation of tin salts, the application to the manufacture of bleaches, and in bleaching, and the still more expansive field of obtaining crude or refined metals from their minerals by more or less direct electrical processes.

Elkington, the inventor of practical electro-silvering and gilding, was the first to refine copper by electrolytic means. He employed alternate current machines in which the current was rectified to one direction by a commutator, as distinguished from the collector of more modern continuous current machines. His patents bear the date of 1866, and are very clear, although there is no definite reference to the nature of the baths nor of the method of employing electricity. For ten years, the electrolytic refining of copper has been practiced by the North German Refinery, at Hamburg; by Messrs. Œschger and Mesdach, at Biache; by the Royal Foundries, at Oker, in Saxony; by the Maison Lyon-Allemand, at Paris; by M. André, at Frankfort; by Messrs. Hilarion-Roux, at Marseilles; at the Moabite Works, near Berlin; by the Elkingtons, at Swansea; and Messrs. Elliott, of Selby Oak, near Birmingham. Before entering on the consideration of conditions of economy for refining copper by means of electricity, we will briefly describe how, as far as is possible to learn, the processes differ among themselves, in a general manner, as employed in the works mentioned.

THE HAMBURG REFINING-WORKS.

Pure coppers are chiefly used as conductors of electricity, but all electrolytically refined coppers have not the same high conductivity, because this conductivity depends on the nature of the metal and on the careful conduct of the operation. That copper at the present moment possessing the highest reputation in this respect is manufactured under the direction of Dr. Wohlwill, by the North Germany Refinery at Hamburg. Entrance for inspection of these works is strictly denied to the general public, and it is not possible to obtain details as to the processes. The daily production of these works is about 2¼ tons—English—of chemically pure copper; and the copper treated contains very frequently precious metals that are recovered from the baths. In 1880, the return of fine gold from the Hamburg works was as much as one ton—English—a veritable gold mine. The current for this deposition is obtained from six Gramme machines—No. 1 type—and by a special machine constructed for these works. This latter machine* has two collectors and four brushes, and each collector has twenty segments. The convolutions of the coils of the armature are formed each of seven bands of copper, 10 millimeters or 0·4 inch wide, by about ⅛ inch thick. There are forty coils of this dimension, corresponding to the forty sections or segments of the two collectors, so arranged that each convolution is formed by two identical half-turns juxtaposed and soldered at their ends to a piece radiating from one of the sections of the double collector. The total resistance of this Gramme ring is 0·0004 ohm, and coupled in parallel, 0·0001 ohm.

The speed of rotation of the armature of this machine is 500 revolutions a minute; and at this speed, the electro-motive force is equal to 8 volts when the coils are connected in series, and to 4 volts when connected parallel. There are eight electro-magnets, each 16·5 inches long, with cores of 4½ inches diameter. On each core is wound, thirty-two times around, a sheet of copper, of width equal to the length of the electro-magnet, and ·045 inches thick. The resistance of the eight magnets in single series is 0·00142 ohm, and grouped in double series, 0·00028 ohm, so that the total resistance of the machine is 0·00038 ohm, or 0·00182 ohm as it is arranged parallel or in series. The total weight of copper is 1620 pounds, and of the machine about 49 cwt. Its normal output of current is 3000 ampères for 4 volts, and 1500 ampères for 8 volts electro-motive force, corresponding to 12,000 watts, or 7·4 watts per pound of copper—a very high efficiency.

The current generated by this machine is led to the baths or vats in which the copper is deposited. The process of deposition is identical in principle in all of the works. It consists in employing as an anode the crude metal to be purified, the refined metal being received by the cathode. The bath of liquid in which the anode and cathode are immersed is usually a solution of sulphate of copper.† It is needless to enter here upon the reactions that are of the simplest character, described in any text-book.

At the Hamburg works, there are forty baths, arranged in two series of twenty. The surface exposed in each bath of soluble anode is nearly 325 square feet, or a total surface of 13,000 square feet in the whole of the baths. The distance between the anodes and cathodes in the bath is about 2 inches. The copper is deposited to a thickness on the cathode of about $\frac{1}{25}$ inch, and at the rate in all the baths of 67 pounds an hour, or 1760 pounds a day, the machine working night and day. This rate of output of metal might appear small, but on reflection its true value is apparent; the product is pure, and the production is so constant that the machine has been working night and day for nine years. The motive power absorbed is about 16 horse-power, or a consumption per pound of pure copper produced of 0·4 horse-power per hour.

Besides this plant, the same works employ two other series of baths, to the number of 120, connected in succession. Each bath has anodes that expose about 160 square feet of surface, the whole of the series of 120 baths having a resistance of 0·1 ohm. The current is furnished by two No. 1 Gramme machines, connected with each other in series, of 300 ampères delivered at 27 volts. The quantity of copper put down is 2000 pounds per day of twenty-four hours, at an expenditure of 12 horse-power, or about ½ horse-power per pound of copper per hour.

Dr. Wohlwill has specially designed his baths with the object of economy of motive power, and from long experience has been led to prefer to work with large surfaces of cathode, and to have on these only thin deposits of copper. In the first installation mentioned, the rate of deposit is only about 0 005 pound per square foot per hour, or only 0·00012 inch per hour in thickness. In the other installations, this deposit has been still further reduced, and, as we have seen, with much benefit in economy of power expended; it amounts to only 0·00004 inch per hour. The former thickness corresponds to nearly 0·02 inch, and the latter to 0·006 inch in a week of 156 hours of work.

If we study these details as represented by the dimensions of the baths adopted in the other works, and in conjunction with the results obtained by Becquerel, Gramme, Mascart, Sprague, and other authorities, we shall be able to arrive at sufficiently accurate estimates of the cost price of a pound of copper as refined by the electrolytic method.

(TO BE CONTINUED.)

* From the *Engineer*.

* For description of Gramme machines and their principles of working, the reader is referred to *Magneto and Dynamo-Electric Machines*, by the author.

† It has been stated, but of course not officially, that nitrates are used in the Hamburg works.—EDITOR ENGINEERING AND MINING JOURNAL.

GOLD MINES AND MINING IN CALIFORNIA.

Written for the Engineering and Mining Journal by Henry Degroot.

The auriferous territory of California is so extensive, the deposits so numerous and diversified, the implements and methods employed in working them so various, and their development in such different stages of progress, that, in writing about these things, one can, in a mere letter, treat the subject in only a very general way. To enlarge upon or even mention individual properties, enterprises, or localities, is out of the question; some brief remarking on the above more general topics being about all that can be done.

Proceeding, then, to deal with these topics in the manner indicated, it may be observed that the business of mining for the precious metals in California is in a fairly prosperous condition, being active, remunerative, and progressive in nearly all of its departments. In the matter of correcting former mistakes and purging this industry of its many abuses, much has been accomplished, winning to it the support of certain classes who before would have nothing to do with it. Owing to diminished water supply, the snow-fall having been light on the mountains last winter, the

HYDRAULIC MINING

season has been a short one; the water in many localities having already given out, this being about a month earlier than usual. As this scarcity of water will stop also a few of the quartz mills, the annual bullion product of the State would have suffered some shrinkage had not this loss been made good by increased yield from river-bed operations, which, through the occurrence of a low stage of water early in the summer, gain just to the extent that these other branches of mining lose by reason of a dry season.

Despite injunctions, a good many of the hydraulic mines continue to be run, their owners finding means to evade the restraining process of the courts. The most of these mines are operated under leases obtained by the Chinese, who, through recourse to their peculiar methods, manage to escape arrest, or, if arrested, manage, by these same methods, to keep their leased claims, and also those they purchase, running all the same. In a few instances, the whites have also, under one pretext and another, been able to continue gravel washing, the plan usually adopted in these cases being for the responsible parties to keep out of the way.

THE WAY THE HEATHEN CHINEE DOES IT.

By the Chinamen, however, a different course is pursued. If the process-serving officer, arriving on the ground, wishes to make an arrest, he is permitted to do so; that is, if he can find out who among a herd of jabbering pagans is the proper man to arrest; for he can not take the whole gang into custody. If the minion of the law hangs around and persists in making trouble, some one in the lot is pointed out to him as the "boss," who, thereupon, is seized, carried off, and locked up in the county jail, where he is suffered to remain, it not being the policy of his masters to bail him out. He does not, in fact, want to be bailed out. Why should he, seeing he is leading what, to him, is a life of luxurious ease—the public boarding and lodging him better than he was ever boarded and lodged before, while his employers allow him his usual wages as long as he is incarcerated? To fine the prisoner, as might be done, would, of course, be a farce. The plan of arresting the entire working force at a mine has not been adopted, as this would only be making matters so much worse. The responsible parties in these cases consist of moneyed men or laborers having money, and who associate themselves together for the purpose of leasing this class of properties, which, under the circumstances, they are able to do on very easy terms. Once in possession, they know that, by recourse to the above methods of procedure, they can continue work without serious interruption. The expense and trouble they are put to in thus defeating the law and baffling the orders of the courts they do not mind in the least, as these companies, getting the mines all outfitted and in working order on very low terms, invariably make large earnings.

So far, the authorities have not been able to find any way of dealing effectually with these violators of the law, and, failing to do so, there is danger that this class of mines will ultimately fall into the hands of these foreigners exclusively. In this event, besides the heavy loss entailed on the original owners, it would happen that none but Chinese labor would be employed in working them, while all the gold taken out would be shipped directly to China, there to remain. Such a result being imminent, it is highly probable that the Legislature of this State will, at its next session, take such action as will enable the owners of these enjoined mines to resume work upon them, having first built suitable dams and other receptacles for holding the coarser and more damaging portions of the *débris*. That they will be permitted to experiment farther in that direction is almost certain. The conditions favoring the retention of this material up near the mines have been every year improving, and are now such that it could be very effectually there retained by the means proposed. This would be relegating the question to the basis of Judge Temple's decision, afterward overruled by Judge Sawyer, who denied the mine-owners the privilege of making trial of reservoirs and dams. With Judge Temple's decision the miners would be content, building the impounding structures at their own expense. Were this course adopted, it would lead to a final if not altogether satisfactory disposition of this vexatious business; at least, so far as the farmers and miners are concerned.

It should be stated that not all the hydraulic mines in California have been enjoined by the courts from running. Only those in the more central tier of mining counties have been so stopped; in other words, those that outlet into the American, Bear, Yuba, and Feather rivers and their tributaries. Those located in Trinity, Siskiyou, and Del Norte counties, which discharge their tailings into the Klamath and its confluents, have not been molested, nor is it likely they ever will be, as none of these streams is navigable, nor are there along them any lands or other property, rights, or interests exposed to injury by this waste material from the mines. Though not conducted on as large a scale as are many of the enjoined properties farther south, the hydraulic operations along these northern rivers are quite extensive, and, by reason of the favorable conditions that obtain here, promise to increase both in magnitude and number. Besides exemption from the *débris* troubles, the country here is well supplied with water, which short and inexpensive ditches suffice to carry on the mines. The auriferous gravel is tolerably abundant and of good grade, and, being but little cemented, and free from volcanic capping, can be worked effectively and cheaply, there being nearly everywhere fall enough to insure all needed dump. Looking over the field, there seems enough to warrant the conclusion that hydraulic mining, whatever inherent and extraneous obstacles it may have to contend with, is nevertheless destined to have a long life in California. The present annual output of these mines amounts to about two million dollars, less than a third of what it would be had not their production been so restricted by the action of the courts. As premised, the present is likely to prove a good year for

RIVER-BED MINING,

a business that was formerly carried on along nearly all the larger gold-yielding streams of the State, but now confined mainly to the Trinity, Scott, Klamath, and Salmon rivers, the little continuing to be done elsewhere being mostly by the Chinese. This, up to the time the rivers became depleted of their treasures, was a very remunerative and, therefore, very popular style of mining. Afterward, it fell to a low ebb, having been given up pretty generally to the Chinese. Of late years, it has experienced some revival, and when the several tunnels driving to receive and divert the water at points where the rivers make short curves, thereby laying bare long stretches of their beds, shall have been completed, there will be taken from these reclaimed portions of the streams such quantities of gold as will, in the estimation of those engaged in these projects, tell sensibly on the gross product of the State. The river-beds in California will continue to be worked, for a time, at first with increasing and then, no doubt, with gradually dimini hing returns. The day of their final exhaustion is afar off—too far to much concern the present generation.

DRIFT MINING.

Through a general avoidance of the mistakes, very common and very disastrous during its earlier stages, this has come to be a tolerably safe and profitable branch of mining. It is pursued mainly along the channels of the Pliocene rivers and under the table mountains in the more central portions of the State, where a good many enterprises of this kind are carried on, some of them costly and of great magnitude. While Forest City, in Sierra County, and the Damascus Divide, in Placer, remain prominent centers of drift mining, many other localities are coming into note, the partial suspension of hydraulic operations having imparted quite an impetus to this branch of mining. While the deposits adapted to be best worked by drifting are very extensive in California, their development will proceed slowly, as it takes time as well as money to explore and open them up. Thus far, they do not appear to have recommended themselves to capitalists, nor are they likely to do so in any special manner. Experience has, in fact, shown that they can be worked to best advantage by associations of practical miners, all the marked successes in the drift diggings having been achieved by companies of this kind. The gold product from this source is estimated at between three and four million dollars a year. It will, in the course of a few years, be considerably larger. The various

OTHER BRANCHES OF PLACER MINING,

such as hand and ground sluicing, working the beach sands and the seam diggings, re-washing the tailings, etc., all continue to be practiced in California; now, of course, for the most part, only in a small way. In the winter, when water is plentiful and free, ground sluicing is carried on in many localities. In the summer, some of the gulches are worked over, the bed-rock being dug deeper and the banks washed farther up. Schemes for moving and washing over the tailings that in great quantities have lodged in the mountain ravines are in progress; Slate Creek and Shirttail Cañon being the sites of the most notable projects of this kind. Since the partial stoppage of hydraulic mining, some of the water before used in piping is employed in washing ground with which nothing could before be done in summer. The two large companies that own Gold Bluff, the strange deposit on the seashore, go on collecting much gold by the novel methods here practiced for thirty years or more, while small companies of miners, mostly "squaw men," contrive to make small wages washing the auriferous sands found along the ocean beach farther north.

And thus it is, the gathering of gold from the California placers goes on, their aggregate yield continuing quite large, notwithstanding that the world had come to believe these placers were depleted to the point of abandonment long ago.

It is, however,

THE QUARTZ MINES

of California that are to prove her most prolific and permanent source of gold production. Having in a previous letter alluded to the increased interest taken in quartz mining in this State, it will suffice to say now that such interest continues unabated, being kept alive by the favorable condition and outlook of this industry in all parts of the State. In the depression, now so prevalent in most other lines of business, is to be found another incentive for our people to turn their attention so sharply to this branch of mining. In the field, work goes on very briskly. Prospecting is active, leading to the discovery of valuable lodes all over our auriferous territory. These finds are followed up very generally by development, and this again by reduction-works, of which a good many have been erected within the past year or two, some of them being of large capacity. As a rule, however, the old error of putting up mills too big or too soon is avoided. Out of this awakening to the subject of quartz mining, there has grown a corresponding interest in the means to be employed for reducing this class of ores. As a consequence, the inventors have been busy, and numerous are the new mechanisms and processes claiming the attention of the mining public. As many of our miners are men of limited means, and many of their lodes afford comparatively little ore, a small, cheap mill of improved pattern has come to be with them a desideratum. Among other machines claiming to fill this want is the Wiswell pulverizer and amalgamator, an improvement on the old mill and a Boston invention. It is simple, cheap, and durable, and appears to be doing good work; but if it wins at all, it will have to win on its merits, the average California miner being prejudiced against any thing having its origin abroad.

One of the special fights that is waged in this province of inven-

tion is that directed to supplanting the old-fashioned stamp by something more cheap, simple, and durable. While this end has not yet been fully attained, it is by good judges believed that it soon will be. That some gains have already been made in the business of beneficiating this class of ores in California, may be inferred from the fact that a great deal of quartz is now worked here with profit that does not pay over four or five dollars a ton; whereas, twenty-dollar ore was at one time rejected as worthless. While the yield of gold from this source will be somewhat larger this year than last, it will be yet another year or more before these present greater activities in the business will be made manifest in a largely increased production. The value of the gold taken from the quartz mines of California the present year will reach, and may possibly exceed, eight million dollars.

British Mint Statistics.—During the year ended December 31st last the total amount of gold, silver, and bronze melted at the Royal Mint was 470 tons. Of this, 67 tons consisted of gold, 198 tons of silver, and 205 tons of bronze, out of which metals the number of coins struck was 65,295,382, as against 49,588,302 struck in 1883, when the total weight of all metals melted was 25 tons less than that of the past year.

Making Lead Sheets by Hydraulic Pressure.—We learn through *Engineering* that J. Brandt, of Berlin, proposes to make sheet-lead by hydraulic pressure in a manner similar to that in use for making lead pipes, instead of by the present method of working down a large block of lead to the required thickness by means of rolls. The receiver for the lead is made of such a length as may be required for the greatest width of sheet that it is proposed to make. The bottom of the receiver is connected with the pistons of several hydraulic rams, and slides up and down in the receiver. A part of the top of the receiver consists of movable jaws, whose distance apart can be nicely regulated by rack-and-pinion arrangement. These jaws being opened sufficiently wide, a charge of molten lead is run into the receiver, and then the jaws are closed to an opening corresponding with the thickness of sheet required. When the lead has cooled to the point that experience shows to be most suitable, the hydraulic pressure begins, and the lead is slowly squeezed out in the form of a sheet.

Mining Partnerships—Assignment of One Partner's Share.—*Bradstreet's* of the 29th ult. has the following: There is no relation of trust or confidence between mining partners that is violated by the sale and assignment by one partner to a stranger or to one of the associates of his share in the property and business of the association, according to the decision of the Supreme Court of the United States in the case of Bissell *vs.* Foss. The court adopted the language of Mr. Justice Field in an earlier case before the same court, in which he said: "Associations for working mines are generally composed of a greater number of persons than ordinary trading partnerships; and it was early seen that the continuous working of a mine, which is essential to its successful development, would be impossible, or at least attended with great difficulties, if an association was to be dissolved by the death or bankruptcy of one of its members or the assignment of his interest. A different rule from that which governs the relations of members of a trading partnership to each other was therefore recognized as applicable to the relations to each other of members of a mining association. The *delectus personæ*, which is essential to constitute an ordinary partnership, has no place in these mining associations."

The Production of Zinc.—The zinc convention between the Silesian and Rhenish-Westphalian producers has now been definitely concluded on the basis of the 1884 production. It is stated that the agreement is to continue four years. The share of the Silesian works in the production will be 1,522,320 centners, of which 432,180 centners will fall to the Schlesische Actiengesellschaft für Bergbau and Zinkhüttenbetrieb alone, while of the share of the Rhineland and Westphalia (775,600 centners) the Stolberger Zinkhütten-Actiengesellschaft will have 285,660 centners. The convention has already had a good effect, the Silesian market being stronger. It may be observed that the raw zinc production of the whole world in 1884 amounted to about 290,000 tons, of which North America produced 30,000 tons, England the same amount, and the European continent the remainder. In the last five years, the production of the continent has increased 12,000 tons on an average yearly, but the convention is to prevent a further increase. To the convention 98 per cent of the zinc producers of the continent have assented, including the French, Belgian, and Spanish works. Excluded from the agreement are several Belgian firms with a production of about 6000 tons, and the small production of Austria and Poland, amounting to some 6500 tons. Negotiations, which promise to have successful result, are in progress between the sheet-zinc producers with the view of regulating the sale of that article.

Electrical Precipitation of Metallic Fumes and Dust.—Under this heading, we described in the ENGINEERING AND MINING JOURNAL, July 18th, 1885, page 39, Mr. Walker's experiments in precipitating lead fumes by electricity. With regard to the original discovery of the process, *Engineering* says: "We lately mentioned that a letter had appeared in a German contemporary, pointing out that in 1850 Guitard had described an experiment similar to that of Professor Lodge. The reference given was to the *Mechanics' Magazine* of 1850, page 346, and it was stated that Wiedemann refers to this in his work *Die Lehre von der Electricität*. The communication to the *Mechanics' Magazine*, signed C. F. Guitard, and dated London, October 29th, 1850, contains the following: 'Some time since, in experimenting on the electric state of the atmosphere, I employed for that purpose a large glass cylinder about 18 inches high and 9 inches diameter, open at the bottom and having a neck at the top. In placing the lower end of this cylinder in water, the more perfectly to exclude the air, and allowing small quantities of tobacco-smoke to enter the neck at the top, the smoke, after assuming various actions, according to, probably, the hygrometric state of the atmosphere, would gradually spread itself into a cloud filling the cylinder, and at length, as successive portions came in contact with the sides of the cylinder, condense. Sometimes half an hour would elapse before this effect took place. It now struck me that, if I brought a wire from an electrifying-machine into the neck of the cylinder, the air would immediately become charged with electricity, which would cause each portion of the smoke to fly to the sides of the cylinder, and that thus more rapid condensation would take place. The effect produced was perfectly magical. The slightest turn of a small electrifying-machine produced immediate condensation. It was astonishing to see how small a quantity of electricity produced a most powerful effect. I am not aware that attention has ever been drawn to this subject; and the question will probably arise, Has electricity any thing to do with the condensation of steam in the condenser?' "

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price!]

Handy Estimate Blanks. Compiled and arranged by J. D. Sibley and A. O. Kittredge. New York: David Williams. 9½ by 12 inches, 28 pages. Paper, 15 cents.

These Blanks have been prepared in order to furnish to contractors and builders a convenient form upon which to make estimates and record the cost of work to be executed. Two general divisions of work are recognized, namely, Masonry and Carpentry.

The Practical Estimator, being a Companion and Key to the Handy Estimate Blanks. By J. D. Sibley and A. O. Kittredge. New York: David Williams. 16mo, 100 pages. Cloth. $1.

This contains full descriptions for the use of the *Handy Estimate Blanks*, and a list of all the items ordinarily entering into a building, so arranged as to be a convenient and systematic reminder of what is to be listed in making an estimate.

(United States Geological Survey. J. W. Powell, Director.) *Paleontology of the Eureka District.* By Charles Doolittle Walcott. Washington: Government Printing-Office. 1884. Quarto, pages xiv + 298 (including Index), 24 Plates, with 31 pages of descriptions of Plates, and 7 illustrations in the text. [Vol. VIII. Monographs of the United States Geological Survey. Department of the Interior.]

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT-OFFICE,
WASHINGTON, July 7, 1885.

TO THE PATRONS OF THE OFFICIAL GAZETTE OF THE UNITED STATES PATENT-OFFICE: An unavoidable delay in the issue of the Official Gazette of this date has occurred in consequence of the fact that the Patent-Office sent the photolithographing of this issue away from the regular contractor as an experiment, and the gentlemen who undertook it have found it impossible to furnish the work in season. The Official Gazette of this date will appear shortly, and will be mailed to subscribers immediately on publication. The numbers for July 14th, and all subsequent dates, will issue regularly as heretofore.

M. V. MONTGOMERY, Commissioner of Patents.

GRANTED, JULY 7TH, 1885.

321,429. Machine for Pulverizing Ores, etc. Gideon Frisbee, Elmore, Ohio.
321,430. Machine for Pulverizing Ores, etc. Gideon Frisbee, Elmore, Ohio.
321,441. Bolting-Chest and Middlings-Purifier. Julius T. Lee, Dryden, Mich.
321,465. Process of Refining Petroleum. Julius H. Tiemann, Brooklyn, New York.
321,499. Pump. William H. Holcombe and Clifford A. Holcombe, Beloit, Wis., Assignors to Holcombe Brothers & Stone Manufacturing Company, Limited, same place.
321,500. Nut-Lock. Robert Howarth, Wolverhampton, County of Stafford, England, Assignor to Moses Bayliss, Edwin Jones, William Bayliss, Samuel Bayliss, and William Edwin Jones.
321,519. Furnace. John Neville, Jersey City, New Jersey.
321,547. Compound Metal-Working Machine. Abner S. Towle, Rochester, New Hampshire, Assignor of one half to John D. Fogg, same place.
321,623. Apparatus for Separating Fine Gold from Sand, etc. Isaac R. McKinney, East Portland, Oregon.
321,660. Turbine Water-Wheel. Charles R. Sylvester, Little Falls, Assignor of one half to George Sylvester, Milwaukee, Wis.
321,670. Rock-Drill. Leander S. Woodbury, Calumet, Mich.
321,693. Manufacture of Sheet-Iron. Isaac E. Craig, Camden, Ohio.
321,700. Rock-Drilling and Well-Boring Machine. Leonard B. Embry, Corsicana, Texas.
321,714. Mining-Pit. Moses Golding, Trenton, New Jersey.
321,736. Fuel-Injector for Furnaces. Henry Mason, Chicago, Ill., Assignor of three fourths to James H. Hildreth, John Riordan, and W. E. S. Trowbridge, all of same place.
321,739. Hot-Air Engine. James J. McTighe, Freeport, Pa.
321,780. Rotary Roasting-Furnace. Albert Arents, Alameda, Cal.
321,794. Rolling-Mill. Harvey B. Chess, Pittsburg, Pa.
321,798. Miner's Candlestick. Thomas Cox, Gloster, Mont.
321,812. Foundryman's Clamp. Thomas Harding, Detroit, Mich.
321,834. Rock and Ore-Crusher. Frederick H. McDowell, Brooklyn, New York.
321,835. Apparatus for Disintegrating Ores. Harrison B. Meech, Cleveland, Ohio.
321,841. Machine for Screw-Threading Bolts, etc. John North, Middletown, Conn.

GRANTED SEPTEMBER 1ST, 1885.

325,235. Nut-Lock. George D. Bulmer and Charles Bulmer, White House, Assignors of one third to William R. Jones, Braddocks, Pa.
325,244. Tube-Expander. Harrison Hayes, Portland, Me.
325,256. Cylinder-Cock. George W. Loomis, Syracuse, New York.
325,259. Revolving Furnace. Henry Mathey, New York City, Assignor to H. G. Bond, same place.
325,262. Process of Manufacturing Sulphuric Acid. J. McNab, Camden, New Jersey, Assignor to the United States Chemical Company, same place.
325,263. Apparatus for the Manufacture of Sulphuric Acid. J. McNab, Camden, New Jersey, Assignor to the United States Chemical Company, same place.
325,273. Safety-Valve. George W. Richardson, Medford, Mass.
325,276. Rotary Pump. Francis M. Roots, Connersville, Ind.
325,288. Centrifugal Separator. Arthur H. Van Duzee, Leavenworth, Kan.
325,292. Apparatus for Applying Liquid Fuel to Blast-Furnaces. Frederick C. Weber, Chicago, Ill.
325,293. Process of Smelting Ore by Means of Petroleum. Frederick C. Weber, Chicago, Ill.
325,311. Wire-Barbing Machine. Albert J. Bates, Joliet, Ill., Assignor to the Joliet Barb Wire Company, same place.
325,328. Hoisting and Conveying Apparatus. Levi Earth, Chicago, Ill.
325,330. Air-Blast Mechanism for Furnaces. Thomas J. Fennell, Elmira, New York.
325,332. Steam-Boiler. William Flagg, Brooklyn, New York.
325,373. Drill-Grinding Attachment for Drilling-Machines. Edward J. Worcester, Worcester, Mass., Assignor to George Burnham and Asa Goddard, same place.
325,387. Amalgamating-Pan. Martin P. Boss, Oakland, Cal.
325,395. Air or Gas-Compressing Pump. John B. Clot, San Francisco, Cal.
325,403. Roof of Furnaces. John H. Flagler, New York City.
325,429. Ore-Separator. David F. McKim, Cable City, Mont.
325,469. Process of Uniting Gold and Vulcanite. John H. Wood, Lebanon, Ohio.
325,478. Elevator-Bucket. Christ Banker and John H. Roberts, Pittsburg, Pa.; said Banker Assignor to William M. Babbott, same place.
325,556. Joint for Metal Tubes. William A. Miles, Copake Iron-Works, New York.
325,557. Separator for Sizing Ore, etc. William A. Miles, Copake Iron-Works, New York.
325,564. Support for Rock-Drills. George W. Nixon, Rockwood, Assignor to himself and William M. Nixon, Chattanooga, Tenn.
325,601. Roller-Mill. Walter Griscom, Philadelphia, Pa., Thomas McFeely, Alexandria County, Va., and Eli T. Butler, Hamilton, Ohio, Assignors to said Griscom and McFeely, and Samuel E. Griscom, Philadelphia, Pa.
325,614. Hoisting and Lowering Apparatus. Isaac I. Lancaster, Tacoma, Washington Territory.
325,615. Gas-Detector for Mines. James A. Lyon, Washington, Pa.

FURNACE, MILL, AND FACTORY.

A recent issue of the London *Mining Journal* makes mention of the fact that the Cloncurry Copper Company, of Queensland, Australia, has got into successful operation the water-jacket smelting plant furnished it by the Pacific Iron-Works, of San Francisco, and is turning out copper bullion at a great saving on previous cost of production. The company now feels confident that the facilities afforded by this process will enable it to make a good profit on its product at the present extremely low prices, as well as to meet any further possible decline. We learn that many other companies in Australia and in America are adopting this process. The severe competition to which copper producers in all parts of the world are now subjected is compelling them to adopt the modern American process of rapid and cheap reduction so generally and successfully introduced in this country by the firm mentioned.

Mr. Julius S. Lane, for many years a member of the Webster, Camp & Lane Company, has become a member of the M. C. Bullock Company, of Chicago, of which he will be general superintendent and manager. Mr. Lane's long and varied experience in designing and building hoisting, pumping, wire rope, haulage, and general mining machinery admirably fits him for the position he has assumed.

James Leffel & Co., of Springfield, Ohio, have issued a very handsome illustrated hand-book for 1885 and 1886 of their improved double turbine water-wheel. The book has 128 pages, and contains, besides descriptions and illustrations of their specialties, tables and matter of value to those interested in the subject of water-wheels.

Mr. M. V. Smith, of Altoona, Pa., is engaged in constructing one of his modified Siemens regenerative gas furnaces for the Hartman Steel Company, at Beaver Falls, Pa.

Both the bar and puddle departments of the rolling-mill at Cumberland, Md., which had been running for several weeks, shut down last month for want of orders. The plate mill is the only department now running.

Moorhead & Co., at Pittsburg, Pa., will soon have in operation a new blooming-mill, with hydraulic lifts, together with other new hydraulic machinery, made by the Lewis Foundry and Machine Company, Limited.

C. G. Hussey & Co., at Pittsburg, Pa., have just made six sheets of copper that are believed to be the largest ever rolled. Each sheet is 13 feet 9 inches long, and 9 feet 7 inches wide.

Mr. James P. Witherow has received the contract for building three blast-furnaces for the Troy Steel and Iron Company, at Troy, New York. The cost of the plant, including foundations, buildings, and trestles, will be over $700,000. Work will begin at once, and the furnaces will be handed over to the company, finished and ready to be put in blast, December 31st, 1886. The furnaces will be 80 by 18 feet, and will have 12 Whitwell stoves. There will be seven blowing-engines, each with a 42-inch steam-cylinder, 84-inch blast-cylinder with a 60-inch stroke. There will be 36 boilers to supply steam for the engines, pumps, and other purposes. Each boiler will be 46 inches in diameter and 34 feet long, with two 16-inch flues. The hoist towers for elevating stock will be massive iron structures equipped with 12 by 12 hoisting-engines. The draught-stack for the complete plant will be built of wrought-iron and lined with fire-brick to a clear way of 13 feet by 225 feet high. There will be three casting-houses, each 165 by 50 feet, boiler-house, and engine-house. The water-tank will be 30 feet in diameter, 32 feet high, and will be built of wrought-iron plates. It will be placed on heavy iron columns 30 feet high. The iron will be tapped from the furnaces and carried directly to the Bessemer converters. The furnaces will be built on an island in the Hudson River just opposite the steel-works. The island will be connected with the works by an iron bridge. The ore used will be a mixture of Champlain and Hudson River ores.

The Pottsville Iron and Steel Company's mills at Fishbach, Pa., are in full operation, with orders enough on hand for a fair prospect of continued operations. Among the orders now filling is one for columns and other iron-work for a new court-house at Terre Haute, Ind. The order amounts to five hundred tons of iron.

A dispatch, dated Charleston, S. C., September 9th, says that the phosphate pools that for the last three years had fixed the price for land rock at $6.50 a ton has dissolved, and sales are made below the pool figures. The pool covered only land miners.

The Clayton Air-Compressor Works have just opened an office and sales-room at 43 Dey street, New York.

LABOR AND WAGES.

Ellis & Lessig, at Pottstown, Pa., have increased the wages of their nailers 12 per cent.

W. P. Rend, of Chicago, has granted a 50-cent rate to miners at Straitsville, Shawnee, and the Ohio Central region.

At Higginsville, Mo., the coal miners of the Winsor Coal Company have resumed work, at 65 cents a ton, after a strike of six weeks. This is about the same as they were getting before the strike.

A Pittsburg dispatch, dated September 10th, says that the river coal miners' strike is spreading, and in a few days the miners expect every mine on the river to be closed. The strikers succeeded in closing all but three mines in the fourth pool to-day. By Saturday, they say that the strike there will be general. Walton's men are still at work in the first pool, but whether they will continue after the convention to be held at Monongahela City on the 15th inst. is a disputed question.

COAL TRADE NOTES.

ILLINOIS.

An explosion of gas in the mine of the Decatur Coal Company, at Decatur, on the 4th inst., severely burned four miners, two of whom will not recover.

A vein of coal, said to be between six and seven feet in thickness, was found, on the 4th inst., at a depth of 245 feet, in the Co-operative Coal Company's shaft, at Chatham.

PENNSYLVANIA.

ANTHRACITE.

The large mining stable of Patterson & Llewellyn, operators of the Big Mountain colliery, near Shamokin, was destroyed by fire on the 5th inst. The entire contents of the building and thirty-five mules were consumed. The loss is estimated at $10,000.

COKE.

The coke trade is just a shade better, says the Connellsville *Courier*. The principal change is an increased activity among the independent ovens, notably the works of W. J. Rainey & Co., and Moyer & Dawson. They have secured orders for 20 cars a day additional, and this has had the effect of putting them on full-time again. The outlook continues promising. Prices remain at $1.20 for foundry coke; $1.40 for furnace coke; and $1.75 for crushed coke. Shipments are now over 3000 cars a week. Labor continues plenty and there is no lack of cars. Of the 10,920 ovens now in the region and controlled by the Connellsville coke trade, 4137 were idle last week.

According to the terms of an agreement entered into last May between the Southwest Coal and Coke Company and H. C. Frick and E. M. and Walton Ferguson, the former company took possession of Morewood coke-works last week.

GAS AND PETROLEUM NOTES.

DAKOTA.

Reports state that a vein of natural gas was struck on the 3d inst., while boring for a well seven miles northeast of Blunt, 145 feet below the surface. Other bores have been sunk to a greater depth in that vicinity, but no gas has been struck.

OHIO.

It is reported that the Hull Gas Company has purchased the three natural gas wells and extensive mains of the Natural Gas Company at Findley for $30,000.

PENNSYLVANIA.

It is understood that the Washington National Gas Company, owner of the old McGuigan well, is quietly dividing one per cent a month with its stockholders.

The Lewis Foundry and Machine Company, Limited, at Pittsburg, has introduced natural gas into its works and office.

Work is beginning to connect the pipes of the Penn Fuel line with those of the Philadelphia (Westinghouse) Gas Company.

A charter has been granted to the Dunlap's Creek Natural Gas Company.

Indications of natural gas have been found on the Richard farm, near Oliver Brothers & Phillips's rolling-mill at the lower end of Alleghany, and a company has been formed to bore a well there.

The People's Natural Gas Company has laid two miles of its pipe line. Work on the remaining sixteen will be pushed rapidly, and the company expects to reach Pittsburg within two months.

The offices of the Penn Fuel Company were closed last week. Hereafter, all business will be transacted at the office of the Philadelphia (Westinghouse) Company, the purchasing company. The Philadelphia Company will have to spend about $1,000,000 to complete the lines contemplated by it and those left unfinished by the Penn Fuel Company.

GENERAL MINING NEWS.

AFRICA.

UNIFIED DIAMOND MINES, LIMITED.—This company has been organized in London, England, with a capital of £10,000,000, with the view of purchasing as large a number as possible of the diamond mining properties, situated in the four mines, Kimberley, De Beers, Dutoitspan, and Bultfontein. These four mines, since their discovery in 1870, have produced more than £40,000,000 worth of diamonds. According to the official statistics of the Cape Colony, the product of the four mines added together exceeded during the last two years the respective figures of £2,680,000, and £2,480,000, even at the actual low price of diamonds. At a meeting of directors, held August 7th, the note upon the purchase scheme was amended. Indebted companies are to pay fifteen shares of £20 each for eight debentures of £20 each.

ARIZONA.

ARIZONA COPPER COMPANY.—The Clifton *Clarion* says that this company's works are running by steam-power, caused by a break in the embankment at the junction of the ditch and the flume. Men are at work repairing the damage.

PEER, PEERLESS, AND CROCKER.—The secretary of these companies reports August 24th as follows: The uprise from Crocker north drift is up 60 feet. The face is in good ore. A cross-cut has been started to the east, which looks remarkably well. This cross-cut gives the appearance of cutting through a large body of good ore. Stoping will begin at once. We are making preparations to sink a winze at about 75 feet south of the uprise on the ore-body. The various cuts, stopes, and winzes on the hill are producing the usual amount of good ore. The winze started 300 feet south of the main winze is down 14 feet. The whole bottom is in ore of a very fine character. Average dump assays taken from the various points for the past week were $85. For several weeks past, we have been at work on the Weldon vein. Along a distance of 500 feet, the vein has been cut in various places, and a cross-cut has been made at about the center of the ore-chute, showing a width of say 20 feet of very fine ore, very compact and solid. Other points cut into show the same character of ore. An average of 23 assays taken with care along the entire length of the ore-chute show a result of $80 a ton, some of the ore going high in the hundreds. Taken altogether, this is the most important development for the limited amount of work ever found in this vicinity, and has every appearance of making a big mine. The twenty-stamp mill started on September 1st, and works well.

STONEWALL JACKSON.—Four leases have been given on this claim, and ore is taken out by the different parties. The mill has started up on tailings, and after this run has been finished, the lessees of the various claims at McMillen will then take the mill and work their ore.

CALIFORNIA.

ALASKA.—The company is adding twenty additional stamps to the mill.

EDWARD WOODRUFF VS. THE NORTH BLOOMFIELD MINING COMPANY.—The Circuit Court at San Francisco began to hear testimony on the 26th ult., in the case of Edward Woodruff *against* the North Bloomfield Mining Company. About a month and a half ago, Judge Sawyer made an order requiring the company to show cause why it should not be punished for contempt of court in violating the injunction granted against it in January, 1884. The charge made is, that the North Bloomfield Company is working the mine by the hydraulic process. The defense is, that the water used was not for hydraulicking, but merely for cleaning

the bed-rock. The suit of Woodruff *against* the North Bloomfield Company was the one in which the injunction was granted that put a stop to hydraulic mining. The litigation against the miners was begun in July, 1876, and after a series of suits, crystallized into the case of Woodruff *against* the North Bloomfield. This case was begun in 1879 and ended in 1884. It was tried at great length, Judge Sawyer frequently visiting the county supposed to be affected, and it was finally settled by the great injunction that ended hydraulic mining. Woodruff is a resident of Saratoga, New York, but owns property in Marysville.

GREEN MOUNTAIN.—Below is given a short history of this mine, which has recently loomed up into prominence in the Grass Valley District: The Greenhorn ledge is on the northern slope of Osborn Hill, about two miles east of Grass Valley. In 1872, the mine was incorporated under the name of the Green Mountain Gold Mining Company. The mine continued in active operation until the spring of 1873, when it was decided to sink another level and put in new machinery. This the company did not feel justified in doing at that time, and so the mine was closed down. From 1873 to the present time, the mine has been idle. In February, this year, the property was leased to Edwin Abrams, by parties who formed the Green Mountain Association, for a period of two years, Abrams to pay the company ten per cent of the gross proceeds, with the privilege of purchasing the mine for $20,000. The Black Lead machinery was leased and moved to the ground, and the mine pumped out and sinking continued. At a meeting of the association, held the beginning of August, a dividend of twenty cents a share was declared.

IRON MOUNTAIN.—According to reports, this mine has been sold for $200,000. Mr. James Sallee, one of the late owners, will remain in full charge and proceed immediately to build a road from the mine to Copley station on the railroad, and will also erect hoisting-works. The shaft at the Sherer and Raddles mine is down 40 feet, and has struck a tellurium ledge nine feet wide.

COLORADO.

The Leadville *Herald* reports the following:

A REMARKABLE PRODUCT.—Mr. Charles Mater is doing considerable placer mining in California Gulch, opposite the site of the former Grant Smelter. Mr. Mater states that the riffles in his sluice-boxes are catching a great deal of free gold, and are also saving large quantities of lead, which occurs in every imaginable form. The larger pieces consist of globules and fragments of base bullion, the product of smelters, which either in slag or otherwise has found its way into the gulch. The most remarkable product of the sluices, however, is a fine black powder that readily melts down into base bullion, showing on analysis a large percentage of silver. This product, Mr. Mater thinks, is nothing more or less than condensed lead fumes from the stacks of the different Leadville smelters. One might easily conceive how a few pounds of this material could be secured in washing a large area of ground; but the reader will be as much surprised at reading the statement as the writer was at hearing it, that Mr. Mater has at various times melted down from one fourth to one half of a ton of the material at a time. After being reduced to base bullion, it runs astonishingly high in both silver and gold.

LITTLE CHIEF.—There is little doubt but that this mine is rapidly following in the footsteps of the Amie and Climax mines, and that in a short time it will possess but little value. For several years past, the property has been worked under the leasing system, and all the stopes from which high-grade ore was extracted in former years have been worked over a second and third time. One thing may be said for the Little Chief, however, says the Leadville *Herald*, that is not applicable to the Amie or Climax, and that is, the property is the hands of honest people, and whatever the profits may be during its closing years, the stockholders will receive their *pro rata*, and the surface improvements will remain on the property for final disposition at the orders of the board of directors.

MANVILLE SMELTER.—The cupelling-furnace of the Manville smelter was to be put in operation last week. The object of this furnace is to reduce a portion of the base bullion made at this smelter into litharge, which product will be used in smelting ores devoid of lead. The desilverization of the base bullion will be only partially effected, and the lead, improved in its silver contents, will be recast into bars, and sent East for final separation. The innovation is one that has become necessary on account of the scarcity of lead ores, and is not one that can be encouraged in the interests of the mines or railroads. If the base bullion product of Leadville is partially cupelled here, our miners may anticipate a reduction in the price paid for lead ores, and the railroads may calculate on a decided falling off in the amount of bullion transported.

ILLINOIS.

CHESPER.—Messrs. Charles E. Rollo, Emery A. Atwater, and John W. Parmelee have incorporated this company, of Chicago, with a capital stock of $100,000, for the purpose of owning, locating, developing, and operating mines and dealing in mining property.

EMPIRE GROUP.—This company has been incorporated at Chicago to carry on a general mining business; capital stock, $500,000; incorporators, A. H. Miller B. B. W. Locke, L. N. Cleaves, Frank D. Ijams, and E. E. Dexter.

MAINE.

BODWELL GRANITE COMPANY.—This company, at Vinalhaven, is busy with several contracts and a force of 500 men is employed, some working overtime, to complete the State, War, and Navy building contract.

GUILFORD SLATE COMPANY.—The new quarry at Guilford is now opening. The location is one of the most desirable, being near the line of the Bangor & Piscataquis Railroad, enabling the company to erect its storehouse alongside the track. A dump of 75 feet at the rear of the works affords facilities to dispose of waste material. The vein has been opened some twelve feet.

MARYLAND.

SOUTHERN AND WESTERN IMPROVEMENT COMPANY.—This company, of Baltimore, has been incorporated by Fielder C. Slingluff, Robert W. Scarlett, William Ferguson, Albert A. Hasson, and William J. Adams, with a capital stock of $200,000. The corporation is formed for conducting a general mining, milling, and real estate business within the State and elsewhere.

MONTANA.

The Butte *Miner*, which is a reputable paper and one that generally serves the interests of its constituency in a manner to inspire confidence in and respect for its statements, thinks that the ENGINEERING AND MINING JOURNAL, or one of its correspondents, is in error in a remark made that "the ore above the 330-foot level of the Parrot Company's mine is mostly extracted," and it gives the report of a visit to the mine by one of its staff. We respect the *Miner*, which endeavors to ascertain facts and to use them as arguments in answering such a statement. For billingsgate takes the place of argument in the columns of some of its neighbors. Now, in answer to the *Miner*, and with full respect for its interesting report, we would say that its representative was not and did not pretend to be an *expert*, and while he says there are at least 150,000 tons of ore ready for extraction above the 330-foot level, we have a lingering suspicion that the *Miner* reporter never measured up 150,000 tons of ore and saw it weighed, and that his ideas on that point are a little misty. We believe that the Parrot has still large bodies of ore in its mine, but we are not yet convinced that the estimate of the *Miner* reporter is as close as one more familiar with this and other Butte mines would make it. Our correspondent's statement was on *excellent authority*, and though perhaps his expression "mostly extracted" may have been interpreted to mean "altogether," or "nearly all," this is not our fault. The large output of the Parrot has come from above the 330 level, and we do not think that those who know the mine believe that there can yet be produced from that ground any thing like the quantity of copper that has already been taken from it.

We have no wish to injure the Parrot or any other mine, and would much sooner like to indorse the *Miner's* sanguine statements than to defend our correspondent's figures. We can only repeat that they were based on excellent authority, and, so far as we know, were not made with any intention of "bearing" this or any other property. The following is the substance of the *Miner's* statement of what it saw in the Parrot Copper Mining Company's mines: The shaft was sunk to the 130-foot level on what is known as the south ledge. The west drift on the 130-foot level is carried in 400 feet from the shaft. The ledge in the face of the drift is at present very barren. The average width of the ledge, however, that contains pay ore on this level, is about six feet. There are on this level, in the different stopes, drifts, etc., at least 35,000 tons of ore ready for extraction. The different stopes, etc., on this level look fine, and instead of the ore above the 330 foot level being "mostly extracted," as was stated, it looks as if the 130-foot level had hardly been touched. In fact, the western part of this level has not been worked to any great extent. The company, heretofore, has directed its attention to the eastern portion of the mine. The ledge in that part of the mine has been nearly all worked out from the 230 to 50 feet above the 130-foot level. The ledge on the 230-foot level is about 30 feet from the shaft and connects the shaft by means of a cross-cut. The west drift is now in 350 feet. The face of the drift looked better at the time of our reporter's visit than it has for some time past, showing now two feet of very fine-looking ore. The drift in the north ledge of the 230-foot level is in 450 feet. The face of this drift is in barren ground, but the several stopes on the ledge on this level are looking well and show vast ore-reserves ready for extraction. The 330-foot level is very rich. No ore has been extracted from this point to the 230-foot level, excepting from the drifts, two floors of stopes, and a few rises put up to determine the extent of the ore. The west drift on the south ledge is now carried in with vigor, and the face shows good ore. The east drift is in 150 feet from the shaft. Some very fine-looking rock has recently been encountered in the eastern ground, between the 330 and 230-foot levels, upon which developments are actively pushed. The west drift on the north ledge is in 400 feet from the shaft. There is four feet of good ore in the face of this drift. This ore was struck a few days ago, and is an entirely new thing, it having never been found on the upper levels. The Parrot is one of the best managed mines in the country. Every thing in and around the mine runs as if by clockwork, and reflects great credit on Mr. Tibbey's admirable management.

NEVADA.

MARTIN WHITE.—At the annual meeting of the company, in San Francisco, on the 20th ult., the superintendent's report showed that the development-work of the mine had been done mostly on and above the 160-foot level. The amount of ore extracted in these operations was 402 tons, of an average assay value of 61 ounces per ton in silver. Considerable of this ore contains gold in small quantities. This ore is now on the surface near the entrance to the 60 and 160-foot levels. No ore has been hauled to the mill the past year. The upper levels—all above the 160-foot level—with a little more prospecting may be called worked out. It will then be best to resume operations on the Mountain Pride level, 100 feet below, where we have some good prospects. Our working on this level two years ago proves there is some ore of high grade—from 200 to 600 ounces per ton. The Big or lower tunnel has required considerable repairing. We have put in many new timbers—center posts, etc. The tunnel will require much care the coming year. We have a good supply of timber and lumber on hand for making any necessary repairs. The financial statement showed cash on hand July 31st, $1948.96.

In the suit of Martin White *vs.* Annis Merril *et al*, on the 21st ult., at San Francisco, the jury disagreed, after eighteen hours' deliberation. Seven were in favor of allowing the plaintiff $300,000; one was in favor of $150,000; another was willing to give him a small verdict; while three were in favor of a verdict for defendant. At the first trial of the case, eighteen months ago, the jury awarded plaintiff damages in $146,000. An appeal was taken to the Supreme Court on the ground that the amount of the verdict was excessive, which was sustained, and the case sent back for a new trial. It will be set on the calendar for a new trial as soon as possible.

NEW HAMPSHIRE.

MILAN.—A large amount of machinery and appliances for the modern treatment and reduction of ores upon quite an extensive scale has been put in the Portland Smelting and Reduction-Works, recently leased by this company. Among the new introductions are two of Bartlett's improved water-jacket smelters and elaborate zinc-works, all of which are now running very successfully on Milan ore. The products of this ore are sulphuric acid, copper, gold, silver, sulphate of zinc, iron paint, and zinc oxide. The ore from this mine is first utilized at the works of the Atwood Lead

Company in Portland, by the extraction of the sulphur for making acid. Then the ore is conveyed to the smelting-works, where a matte is produced worth about $60 a ton in copper and a like value of gold and silver. The matte product is from two to four tons daily and the zinc product about five tons. Eighty men are now employed at the mine in Milan.

NEW MEXICO.

FLAGLER REDUCTION-WORKS.—The company is putting up a refining-plant in connection with its lixiviation-works at Silver City. It will hereafter refine its concentrates at home and ship only bullion. The works are lit by electricity. The company has electric light works of its own, but is quite willing to put in any number of lamps that may be required by outsiders at reasonable rates. The cost of this light will be about the same as that of gas at $2.50 a thousand. The lamp to be used is the Perkins incandescent.

NORTH CAROLINA.

NEW HOOVER HILL.—The official report for July says: The Briol shaft is down 40 feet below the 230. The vein in the bottom is carrying a low grade of ore, but in the north end of shaft the ore has improved. The vein showed a stringer about 2 inches wide, carrying a fair grade of ore. The winze below the 230 north is down 23½ feet, the vein carrying a low grade of ore. The ore broken from the stopes below the 170 during the month was of a fair grade, and continues about the same. Hawkins's: In No. 1 stope, the ore is of about the same quality as heretofore. No. 2 continues good, and appears to be widening in the bottom. In the prospecting-drift west from Hawkins's at 135, an advance of 6 feet has been made, and as there was but little work done here during the month, there is no change to note in the appearance of the ground. Open cut: The shaft is down 133 feet below the collar, and the timbering completed to this point. In the drift west from the open cut shaft, at 40 feet, we are stoping in the bottom; the ore is soft, and of a fair grade. We purpose putting the small Dean steam-pump in the shaft before the end of the month, as we are down to a depth where we shall be troubled with the water, after which time we shall be able to dispense with the Hawkins pump. We have made a communication between the open cut shaft and the main tunnel, to carry off the water from the discharge of pump. Mill running for the month of July as follows: 20 stamps, 22½ days, crushed 696 tons of ore, producing 376·43 ounces of gold. The mill was stopped for 41 hours, caused by breaking of pitman of crusher, during which time the opportunity was taken to put on two new cams. Bar No. 30, weight 360·43 ounces, has been shipped; insured value, $6400.

PENNSYLVANIA.

We have been advised that the new granite quarries at the Falls of French Creek promise to be a valuble addition to the building-stone products of Chester County. Stone of any size can be got, and its appearance is equal to any thing in the market. There are three quarries already started, with plenty of room and promise of more in the near future.

SOUTH AMERICA.

PERU.

The deposits of nitrate of soda run along the whole coast, from the twenty-third to the twenty-fifth parallel of latitude. The deposits were discovered in 1833 by an accident, the hero of the discovery being a forlorn old Englishman by the name of George Smith. There is no telling how much lies in these mines; but it is the opinion of those who have explored the country that, at the present rate of excavation, it will take eight or ten centuries to dig it away. Under the surface of drifting sand, is a crust of clay, from three to five inches thick. This crust covers a bed of crude nitrate from three to six feet deep, the limits of which have not been measured. Years ago, when its value was not fully recognized, private parties, mostly Englishmen and Germans, went into the nitrate beds, and by the self-enacted laws that exist among all mining settlements each was allowed his claim. Then the government of Peru and Bolivia stepped in and prohibited further locations, but not until enough had been taken up to supply the market for the rest of this century. The cost of mining is not much greater than the cost of digging a ditch in ordinary clay, and the deposits are fifteen and twenty miles from the seaports. The nitrate is shipped crude to the market for fertilizing purposes, but there are factories along the coast in which the raw product is purified for chemical uses. This purification is accomplished by boiling in water. The impurities rise to the surface and are removed by skimming, and the heavy niter settles at the bottom of the vat and crystallizes at a certain degeee of heat. Then the water is drawn off and distilled, producing the iodine of commerce. The nitrate is shipped in bags of 100 pounds each, and the iodine in casks made of hard wood, which are protected by having hide covers shrunk around them. Most of the product goes to Europe, and but a small proportion to the United States. The harbors of Iquique, Pisagua, and Antofagasta, which are nearest to the nitrate beds, are full of ships of all European nations. It was this product that caused the war between Chili and Peru. The motive was the jealousy of Chili, and her desire to acquire this rich territory, which belonged to Bolivia and Peru; but the ostensible *casus belli* was the act of the Bolivian government in imposing an export duty of ten cents per cwt. upon nitrate. At the port of Antofagasta, a Chilian company had nitrate-works, and refused to pay the export tax. The Bolivian government seized the works and was about to sell them at auction, when a Chilian man-of-war appeared, landed a force to protect the property, and the struggle began that ended in the seizure of all Bolivian territory on the coast and the most southerly province of Peru.

VIRGINIA.

Mr. J. H. Lerner has leased of Mr. E. A. Packer, of New York City, the manganese deposit on Guy Run mineral lands, near Goshen Station, on the Chesapeake & Ohio Railroad, and is proceeding to develop them.

AMERICAN MANGANESE COMPANY, LIMITED.—The company continues to increase the output of the Crimora mine, near Crimora station, on the Shenandoah Valley Railroad. The railroad is increasing its siding-room to accommodate the increasing business of this company.

MARKETS.

NEW YORK, Friday Evening, Sept. 11.

Silver.

The London market has been quite nominal since our last issue, under lower Indian exchange and a light business with the East. Sterling exchange, with us, has been weak and lower, and these two causes have operated to produce lower figures for silver than ever before known, with one exception.

DATE.	London. Pence.	N. Y. Cents	DATE.	London. Pence.	N. Y. Cents.
Sept. 5	47⅞	104	Sept. 9	47 13-16	103¾
7	47⅞	104	10	47 13-16	103¾
8	47⅞	104	11	47⅞	103⅞

United States Assay-Office at New York.—Statement of business for the month ended August 31st:

Deposits of Gold.		
Foreign coin		$151,000
Foreign bullion		83,000
United States bullion		513,000
United States bullion (re-deposits)		53,000
Jewelers' bars		92,000
Refined gold		181,000—$1,073,000
Deposits of Silver.		
Jewelers' bars		$12,500
Foreign coin		120,000
Foreign bullion		58,000
United States bullion (contained in gold)		6,500
United States bullion, re-deposits		4,500
Idaho		9,500
Lake Superior		1,500
Montana		209,000
New Mexico		23,000
Refined silver		44,000— 488,500
Total deposits		$1,561,500
Gold bars stamped	$100,166	
Silver bars stamped	449,754—	549,921

The Amount of Silver in Circulation.—At the Sub-Treasury, Cashier Flood has made up the following concise statement, which shows the condition of silver money in the United States on September 1st:

There are silver certicfiates representing silver dollars	$138,792,186
Less amount in Treasurer's hand	42,712,890
Certificates outstanding	$96,079,296
Silver dollars and bullion in Treasury	$170,620,411
Less certificates outstanding	96,079,296
Silver dollars owned by the government	$74,541,115
Entire Coinage and Circulation.	
From Feb. 28th, 1878, to June 30th, 1885	$203,884,381
Coined in July and August, 1885	4,347,000
Total coinage	$208,231,381
Silver dollars and bullion in the United States Treasury	170,620,411
Amount in circulation	$37,610,970

United States Mints.—The following is a statement of the coinage executed at the mints of the United States during the month of August, 1885:

Denomination.	Pieces.	Value.
Double eagles	204,000	$4,080,000.00
Total gold	204,000	4,080,000.00
Standard dollars	2,447,000	2,447,000 00
Dimes	20,662	20,066.20
Total silver	2,467.662	2,449.066.20
Total coinage	2,671,662	6,529,066.20

The output of silver dollars from the Sub-Treasury during the last two days has been about $110,000. There were paid into the Sub-Treasury yesterday $19,000 in silver dollars. This statement takes no account of the amount of silver in circulation on February 28th, 1878, a portion of which is still out.

Copper.—The market has been fairly active during the week. There have been sales of copper not Lake of about a million of pounds at full prices. Lake copper is not obtainable at 11c., unless for large contracts, although there is considerable inquiry for it. Prices are firm, and we may quote as follows: Lake, 11@11¼c.; Baltimore, 10¼@10·30c.; Orford, 10¼@10½c.; Best brands Arizona, 10½@10⅝c.

Chili Bars continue weak in London. Cables to the Metal Exchange quote Chili Bars £42 2s. 6d. Best Selected is quoted at £47 10s.

EXPORTS OF COPPER FROM THE UNITED STATES, FIRST SEVEN MONTHS OF 1885.

Month.	Ores. Tons.	Ores. Value.	Ingots, Bars, etc. Pounds.	Ingots, Bars, etc. Value.
January	3,046	$432,036	4,351,594	$505,884
February	1,472	161,430	2,408,128	269,928
March	2,268	238.180	3,999,632	444,510
April	4.723	465,496	2,515.419	275,991
May	5,687	612,754	2,383,063	251,306
June	2,259	338,396	3,813.178	402,523
July	2,442	261,404	3,861,572	372,257
Total	21,897	$2,529,696	23,332,586	$2,522,399

Month.	Sheets. Pounds.	Sheets. Value.	All other M'f'res. Value.	Total value.
January	2,552	$434	$6,196	$944.550
February	2,709	432	11,358	443.148
March	9,821	1,436	9,603	693.729
April	2,050	369	12,883	754,739
May	7,409	1,439	7,536	873,035
June	.....	.....	7,056	747,975
July	2,469	412	13,651	667,724
Total	27,010	$4,522	$38,283	$5,124,900

Henry Bath & Sons' copper report, August 18th, 1885, states that some 6000 tons of Rio Tinto Regulus have been taken by the smelters for monthly deliveries; price is supposed to be based on that of Best Selected copper in each month. About a fortnigh back, some 1800 tons of American concentrates and matte were sold for forward delivery at 8s. and 8s. 6d. per unit respectively, but furnace material for the moment is very much neglected, and smelters show no disposition to pay more than 8s. for Regulus, and confine their purchases to actual requirements. Transactions comprise about 1400 tons of Portuguese, Cape, Mexican, and Quebrada ores at from 8s.@8s. 6d., and 300 tons English and Spanish Precipitate at 8s. 3d. and 8s. 9d. per unit.

	Imports.	Deliv's.	Stocks.
Chili copper at Liverpool, Swansea, and in France	840	1,052	33,046
Foreign copper in London, chiefly Australian	230	298	5,234
American copper at Liverpool	866	528	1,138
Other copper at Liverpool and Swansea	1,804	1,172	4,184
American copper in France	260	285	980
Other copper in France	355	360	20
Tons fine copper during the fortnight	4,355	3,695	44,602
Against tons on July 31st, 1885	3,713	3,421	43,942
Against tons on July 16th, 1885	4,084	3,512	43,550

	Afloat and chartered for.	Total visible supply.
Chili copper at Liverpool, Swansea, and in France	9,974	43,020
Foreign copper in London, chiefly Australian	1,700	6,934
American copper at Liverpool	.....	1,138
Other copper at Liverpool and Swansea	.....	4,184
American copper in France	.....	980
Other copper in France	.....	20
Tons fine copper during the fortnight	11,674	56,276
Against tons on July 31st, 1885	9,700	53.642
Against tons on July 16th, 1885	9,448	52,998

Tin.—Tin has remained steady at from 20·75@21c. for spot and 20·25@20·50 for futures. The cable to the Metal Exchange reports it to-day at £90 10s. for spot.

Lead.—The market continues quiet and firm at 4¼c., with but little business doing. In London, Soft Spanish lead is quoted at £11 5s.

Messrs. John Wahl & Co. telegraph to us as follows to-day :

The market does not reveal any activity, but, on the other hand, shows no sign of weakness, holders having quite frequent inquiries for small lots, maintaining prices fairly well. Stocks in hands of holders are limited, hence offerings are very light. Sales for the week sum up to 150 tons Chemical at 4·12½c. and 250 tons Refined at 4·15c.

Spelter and Zinc.—This market has been very quiet this week, but prices remain firm. We quote 4·40@4·50c. Domestic, and 4·85@4·90c. Foreign. Silesian Spelter is quoted to-day at £14 7s. 6d.

Sheet-Zinc is in good demand, and is quoted at 5⅝@5⅞c.

Antimony.—This metal is unchanged at 9c. for Hallett's and 9⅜c. for Cookson's. In London, £37 for Hallett's.

Bismuth.—Worth from $2@$2.25 a pound.

Aluminium.—$8@$9 a pound ; 10 per cent Cowles Aluminium Bronze Ingots, $1 a pound ; 7 per cent Aluminium Bronze, 78c. a pound ; 5 per cent Aluminium Bronze, 56c. a pound ; 2½ per cent Aluminium Bronze, 34c. a pound ; Aluminium Silver Alloy, composed of 1 part of 5 per cent aluminum bronze and 2 parts nickel, 75c. an ounce.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 11.

American Pig.—There is still a slight improvement in business in this brand of iron, although sales are generally confined to small lots. We hear that the Thomas Iron Company has sold about 8000 tons, the greater part of which is Gray Forge, to Pennsylvania iron mills, for delivery within the next sixty days. Prices remain about the same, and we still quote $18 for No. 1 X ; $16 for No. 2 X ; and $15@$15.50 for Gray Forge.

Scotch Pig.—There are many inquiries, but very little business doing. Prices are firmer. Coltness, $19.50@$19.75 ; Summerlee, $19@$19.50 ; Glengarnock, $18.50@$19 ; Dalmellington, $18@$18.50 ; Eglinton, $17.50@$18.

Bessemer Pig and Spiegeleisen.—Prices are unchanged at $16@$17 for No. 1 Domestic, and $18@$19 for Foreign.

Spiegeleisen, 20 per cent manganese, sells at $24@$25 ; and Ferro-manganese, 60 per cent, $50.

Steel Rails.—There is quite some business doing, and the mills appear to be well stocked with orders. Prices remain firm, and while $30 is asked, $29 is the ruling price.

Merchant Iron.—There is still a good business in Bar iron, and prices are much firmer. We quote Common at 1·50c. and Refined at 1·75@1·90c.

Plates are firmer, and are quoted at 1·95@2·1c.

Structural Iron.—There is a good business doing in Beams and Building irons, and prices are well maintained. Angles are quoted at 1·90@2c. ; Tees, at 2·25@2·3c. ; Beams, 3c.

Old Rails.—Very little business has been done, so far as we can learn. We quote $16@$17.

Old Wheels—$14.50@$15.

Philadelphia. Sept. 9.

[From our Special Correspondent]

Several cargoes of ore have arrived this week from abroad.

Pig-Iron.—Two or three special brands of iron have advanced 50 cents a ton. No considerable sales have been made at the advance. The furnaces are sold up from two to three months ahead. There is abundance of other irons suitable for buyers that can be had at old figures. This week's sales of Foundry iron, Nos. 1 and 2, will foot up from 5000 to 6000 tons, as far as reported, not including a lot of inferior Foundry, for which contracts are reported to have been made for delivery during the fall and winter months. The indications are to-day, that there will be a good deal of Foundry iron sold during the next six or eight days. The makers are firmer than they have been, but at the same time there is no difficulty in making reasonable terms. No. 1 Foundry runs all the way from $17@$18.50. No. 2 is firmer than it has been for several weeks at $15.50@$16. There is a good deal of inquiry for No. 2, and it will sell well at inside figures. Forge runs from $13.50@$15.50, but any thing under $15 is of doubtful quality, and but little of it is going. Two or three parties representing Virginia and Alabama irons are working the market actively, but up to to-day have not made much headway.

Muck-Bars.—Contracts have been placed for Muck iron for thirty days' delivery at $26.50.

Blooms.—Anthracite Blooms are called for with considerable activity.

Merchant Iron.—The week has been a good one for common iron. It is understood that car-builders have been placing considerable orders for common iron, but prices have not been named. It was rumored that contracts have been taken as low as $1.25, but this is doubted. Small lots have been sold at $1.35@$1.40. Car-builders have contracted in the interior for Medium iron at $1.50@$1.60. The mills around Philadelphia are selling Medium iron at $1.65, and Refined at $1.75. They have a good deal of business on hand, and the accumulation every day, if continued for a month or so, will soon put makers in a condition to ask better prices. The Maukri Decoration Company, for the manufacture of iron and steel products, has been organized at Williamsport with a capital of $1,000,000.

Nails.—Car-load lots of nails are going. Contractors, store-keepers, and buyers generally are doing a little better than they have done, feeling satisfied, from recent developments elsewhere, that nails will be higher before they are lower. The nail-makers are taking all the business that comes along, and are in good shape. Quotations are $2.10@$2.15, with the probability of $2.15 being the average figure soon. Buyers are uncertain whether to provide for large requirements or wait. Stocks in retailers' hands are low.

Plate and Tank Iron.—The plate mills have picked up about a week's run of business during the past week, and some Eastern mill-owners are endeavoring to get 2 cents for small lots of plate. There is a desire among plate-mill men to push prices to a little more remunerative limit, and they say that the present course of business will enable them to do it by the end of the month.

Structural Iron.—Angles are selling at 1·90c. ; Beams and Channels, 3 cents. Orders are coming in every day. The mills are full, and heavy deliveries are made to bridge builders. Specifications are in hand this week for nearly 3000 tons in all.

Sheet-Iron.—The sheet mills are stronger than they have been before this year.

Wrought Pipe.—The wrought pipe mills are filling up rapidly.

Skelp.—Large lots of skelp have been sold, and there is a heavy demand in the market for the entire capacity of the mills. Prices range from $1.75@$1.85.

Steel Rails.—Steel rails are quoted at $28.50. It is given out that the mills are full. This means that they are able to take all the orders that come along, which they are doing at $28.50 and $29 for small lots ; $30 is quoted for rails after January 1st, and there are a number of buyers in the market who offer $29 for delivery after that date.

Old Rails.—Old rails are held at $17.50. There are a good many buyers in the market offering $17 and $17.25.

Scrap.—The best figures paid for Selected Scrap this week were $18 ; but holders are anxious to realize on some of their heavy accumulations of stock, and are selling selected lots at $17 and $17.50.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 11.

Statistics.

Production of Coke on line of Pennsylvania RR. for week ended September 5th, and year from January

Tons of 2000 pounds.

	1885. Week	1885. Year.	1884. Week.	1884. Year
Alleghany Region.	4,183	129,629	3,272	90,863
West Penn. RR....	1,536	34,379	...	24,865
Southwest Penn.RR	42,823	1,310,918	39,518	1,527,798
Penn. & W. Region	3 933	165.636	4,043	131,080
Monongahela	1,301	67,170	1,072	52,926
Pittsburg Region.	.....	.. ..	.....	136
Snow Shoe.....	665	12,020	499	15,951
Total....	54,441	1,719,752	48,404	1,843,619
Decrease.....		123,867	.....	.....

Production Anthracite Coal for week ended September 5th, and year from January 1st :

Tons of 2240 lbs.	1885. Week.	1885. Year.	1884. Week.	1884. Year.
P. & Read. RR. Cc..	262,877	7,144,492	168	7,059,911
L. V. RR. Co.....	143,705	3,662,289	.....	3,832,154
D., L. & W. RR. Co.	119,065	2,971,241	26,918	3,296,902
D. & H. Canal Co..	89,951	2,349,774	.....	2,455,427
Penna. RR.:				
N. & West Br. RR.	25,254	785,547	17,754	566,404
S. H. & W. B. RR.	6,556	153,423	3,599	131,437
P. & N. Y. RR....	12,131	270,056	.....	260,586
Penna. Coal Co	31,712	826,369	1,297	832,676
Penna. Canal Co....	15,029	245,533	13,656	264,237
Shamokin Div., N. C. RR	24,729	635,079	12,357	676,519
Lykens Valley.....	*10,000	336,917	10,728	369,445
Total...	741,009	19,380,720	86,477	19,745,698
Increase..	654,532		....	.....
Decrease	... ...	364,978	....	.....

* Estimated.

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period :

1880.....14,941,806 | 1882.....18,860,335
1881.....18,629,205 | 1883.....21,101,449

Production Bituminous Coal for week ended September 5th, and year from January 1st :

Tons of 2000 pounds, unless otherwise designated.

EASTERN AND NORTHERN SHIPMENTS.

	1885. Week.	1885. Year.	1884. Week.	1884. Year.
Philadelphia & Erie RR	18	21,033	... ...	.....
*Cumberland Region, Md.....	**	1,771,566	49,054	1,887,570
Barclay Region, Pa.				
Barclay RR.... ...	3,967	160,184	4,638	204,619
Broad Top Region, Pa.				
Huntington & Broad Top RR.....	2,549	103,981	**	125,803
East Broad Top....	.....	.....	.....	... .
Clearfield Region, Pa.				
Snow Shoe.....	1,503	97,429	2,937	122,967
Karthaus (Keating)	1,730	84.174	1,087	29,525
Tyrone & Clearfield	55,971	1,973,136	60,591	2,109,861
Alleghany Region, Pa				
Gallitzin & Mountain....	12,037	349,505	6,810	254,878
Total	77,775	4,561,008	125,117	4,735,223

* Tons of 2240 lbs.
** Report not received.

WESTERN SHIPMENTS.†

Pittsburg Region, Pa.				
West Penn RR.....	2,983	155.230	5 171	190.045
SouthwestPenn.RR.	1.731	67.396	1.528	89,607
Pennsylvania RR...	2.891	142,140	5,708	190,120
Westmoreland Region, Pa.				
Pennsylvania RR...	38,875	790,594	28,918	879,574
Monongahela Region, Pa.				
Pennsylvania RR...	5,993	182,062	3,513	103,472
Total.....	52,473	1,337,422	44,838	1,452,818
Grand total ...	130.248	5,898,430	169.955	6,188.041

†Considerable gas-coal shipped East, of which no division is made in report.

Chesapeake & Ohio Railroad Company's report of total output and distribution of coal and coke Received from mines on line of Chesapeake & Ohio Railroad (including mines on Lexington Division) for the week ended August 31st and year from January 1st. Tons of 2000 pounds :

Kind of coal.	Week. 1885.	Week. 1884.	Year. 1885.	Year. 1884.
Cannel.....	701	800	15,710	13,464
Gas....	7.553	10,433	236,963	206,483
Splint and block	2,723	4,677	101,463	58,437
New River, etc.	21,494	6,644	379,947	282,142
Coke....	2,233	2,145	78,059	42,628
Total.....	34,704	24,699	812,142	603,154

Anthracite.

About the beginning of July, it is customary for the coal trade to get into a very quiet rut ; but long before this season of the year, it is usually moving along with more or less satisfaction to the producers. This year, the trade became dull at the usual time ; but so far, it has but barely improved from the worst. There were one or two indications of some recovery ; but they were speedily smothered by action of the managers. There were indications of a better business early in the week ; but later events appear to have checked this somewhat.

The event of the week has been the announcement that the Pennsylvania Coal Company is selling coal to its contractors at the following prices per ton f. o. b. Newburg : Stove, $3.50 ; Chestnut, $3.15 ; and Broken and Egg, $3. This company recently announced prices 10 cents a ton higher than these. They were promptly met by the Lackawanna Company f. o. b. Hoboken. As there is a difference in the cost of putting coal alongside in this city in favor of Hoboken of 10 cents a ton, the Lackawanna Company was naturally taking the business. This reduction, therefore, is only an equalizing of prices once more. It is generally supposed that the cutting has been going on for some time, although only now acknowledged.

As the coal trade is now on a losing basis all around,

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.			Dividends. Total paid to date.	Dividends. Date and amount per share of last.		
1	Adams, s. L	Colo.	$1,500,000	150,000	$10	*	....	....	....	$232,500	Aug.	1885	.10
2	Alice, s. c	Mont	10,000,000	400,000	25	*	....	....	....	650,000	Sept	1885	.06¼
3	Amie Con., s. L	Colo.	5,000,000	500,000	10	*	....	....	....	330,000	Oct.	1883	.05
4	Atlantic, c	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	230,000	Feb.	1885	.50
5	Argenta, s	Nev..	10,000,000	100,000	100	295,000	July	1885	.10	40,000	Feb.	1880	.20
6	Barbee & Walker, s.	Utah	1,000,000	100,000	10	*	....	....	....	60,000	Nov	1880	.10
7	Bassick, G. S.	Colo.	10,000,000	100,000	10	*	....	....	....	400,000	Mar.	1884	$1.00
8	Belle Isle, s	Nev..	10,000,000	100,000	100	120,000	Mar.	1884	.20	300,000	Dec.	1879	.25
9	Belcher, G. S	Nev..	10,400,000	104,000	100	2,186,135	Apl	1883	.25	15,397,000	Apl.	1876	1.00
10	Big B'nd Hydraulic, G	Dak..	1,000,000	200,000	5	*	....	....	....	144,000	May	1885	.03
11	Black Bear, G	Cal..	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
12	Bodie Con., G	Cal..	10,000,000	100,000	100	275,000	Dec.	1883	.50	1,695,000	Apl.	1885	.50
13	Bonanza Developm't	C & M	3,000,000	300,000	10	....	....	....	....	135,000	Oct.	1882	.15
14	Bonanza King, Cons.	Cal..	1,000,000	100,000	10	*	....	....	....	185,000	Feb.	1885	.10
15	Boston & Mont, G	Mont	2,000,000	200,000	10	*	....	....	....	310,000	Jan.	1883	.05
16	Breece, S	Colo.	5,000,000	200,000	25	*	....	....	....	2,000	Feb.	1880	.01
17	Bulwer, G	Cal	1,000,000	100,000	100	20,000	Jan.	1885	.20	175,000	Jan.	1884	.10
18	Calumet & Hecla, c	Mich	2,500,000	100,000	25	....	....	....	....	27,350,000	Jun.	1885	7.00
19	Carbonate Hill, s. L	Colo.	2,000,000	200,000	10	*	....	....	....	80,000	Apl.	1884	.05
20	Caribou Con., s	Colo.	1,000,000	100,000	10	*	....	....	....	50,000	Mch	1880	.10
21	Castle Creek, G	Idah.	100,000	100,000	1	*	....	....	....	51,000	Oct.	1883	.03
22	Catalpa, s. L	Colo.	3,000,000	300,000	10	*	....	....	....	270,000	May	1884	.10
23	Central, C	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,710,000	Feb.	1885	5.00
24	Christy, s	Utah	10,000,000	100,000	100	....	....	....	....	10,000	Jun.	1885	.10
25	Chrysolite, s. L	Colo.	10,000,000	200,000	50	*	....	....	....	1,650,000	Dec.	1884	.25
26	Colorado Central, s. L	Colo.	3,000,000	300,000	10	*	....	....	....	45,000	Aug.	1885	.05
27	Con. Gold Mining, G	Ga..	500,000	100,000	5	*	....	....	....	108,000	Nov	1883	.02
28	Contention, s	Ariz.	12,500,000	250,000	50	....	....	....	....	42,587,000	Dec.	1884	.25
29	Crescent, s. L. G	Utah	15,000,000	600,000	25	‡	....	....	....	180,000	Sept	1885	.05
30	Crown Point, G. S	Nev..	10,000,000	100,000	100	2,675,000	Feb.	1882	.25	11,588,000	Jan.	1875	2.00
31	Deadwood-Terra, G	Dak..	5,000,000	200,000	25	*	....	....	....	§900,000	Jan.	1883	.10
32	Derbec B. Grav., G. S.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	80,000	Jun.	1885	.10
33	Dunkin, s. L	Colo.	5,000,000	200,000	25	*	....	....	....	220,000	Sept	1884	05
34	Eureka Con., G. S. L	Nev..	5,000,000	50,000	100	350,000	Jan.	1884	1.00	4,817,500	July	1882	.25
35	Evening Star, s. L	Colo.	500,000	30,000	10	*	....	....	....	1,400,000	Nov	1883	.50
36	Excelsior, G	Cal..	10,000,000	100,000	100	460,000	Sept	1884	.50	875,000	Oct..	1883	.25
37	Father de Smet, G	Dak..	10,000,000	100,000	100	200,000	Nov	1878	1.00	990,000	Aug.	1885	.20
38	Franklin, C	Mich	1,000,000	40,000	25	220,000	Jun	1871	....	480,000	Jun.	1885	1.00
39	Freeland, G. S. C	Colo.	5,000,000	200,000	25	*	....	....	....	110,000	Sept.	1885	.10
40	Fresno Enterprise, G	Cal..	5,000,000	100,000	50	....	....	Mch	1883	.10	110,000	July	1882	.10
41	Gem, S	Colo.	125,000	125,000	1	....	....	....	....	23,750	May	1883	.02
42	Glen, S	Colo.	100,000	100,000	1	....	....	....	....	7 000	May	1883	.01
43	Gould & Curry, G. S.	Nev..	10,300,000	108,000	100	3,856,800	Jun	1885	.40	3,828,000	Oct.	1870	10.00
44	Grand Central, S	Ariz.	1,000,000	100,000	10	....	....	....	....	625,000	Dec.	1882	.25
45	Grand Prize, S	Nev..	10,000,000	100,000	100	530,000	Nov	1884	.30	495,000	Mar.	1884	.25
46	Granite, S	Colo.	125,000	125,000	1	....	....	....	....	6,250	May	1883	.01
47	Granite Mountain, S.	Mont	10,000,000	400,000	25	....	....	....	....	300,000	Aug.	1885	.10
48	Green Mountain, G	Cal..	1,250,000	125,000	10	*	....	....	....	212,000	Nov.	1881	.07½
49	Hale & Norcross, G. S	Nev..	11,200,000	112,000	100	4,650,000	Aug.	1885	.50	1,598,000	Apl.	1871	5.00
50	Hall-Anderson, G	N. S..	150,000	150,000	1	....	....	....	....	7,000	Jan.	1882	05
51	Hecla Con., S	Mont	1,500,000	30,000	50	....	....	....	....	867,500	Aug.	1885	1.00
52	Hel'a Mg & Red, G. S. L	Mont	3,000,000	600,000	5	*	....	....	....	72,000	Jan.	1885	.06
53	Henriett, L	Colo.	....	270,000	....	....	....	....	....	27,000	Feb.	1883	.10
54	Holyoke, G	Idah.	200,000	200,000	1	....	....	....	....	52,000	Nov	1883	.02
55	Homestake, G	Dak..	12,500,000	125,000	100	200,000	July	1878	1.00	2,875,000	Aug.	1885	.35
56	Honorine, S. L	Utah	500,000	250,000	2	25,000	July	1883	.. ..	50,000	Aug.	1885	.05
57	Hope, S	Mont	400,000	8,000	50	*	....	....	....	158,252	Oct..	1884	1.50
58	Horn-Silver, S. L	Utah	10,000,000	400,000	25	*	....	....	....	4,000,000	Nov.	1884	.50
59	Idaho, G	Cal..	310,000	3,100	100	....	....	....	....	3,620,800	Apl.	1885	7.50
60	Independence, S	Nev..	17,000,000	100,000	100	320,000	Aug.	1885	.20	225,000	Sept	1879	.25
61	Indian Queen, S	Nev..	250,000	125,000	2	....	....	....	....	368,750	July	1883	03
62	Inyo, G	Cal..	500,000	100,000	5	*	....	....	....	45,000	Apl.	1882	.05
63	Iron-Silver, S. L	Colo.	10,000,000	500,000	20	*	....	....	....	1,400,000	July	1885	20
64	Jackson, G. S	Nev.	5,000,000	50,000	100	10,000	Nov.	1880	.20	20,000	Jun.	1885	.10
65	Jocuistita, S	Mex.	10,000,000	100,000	100	....	....	....	....	1,200,000	Feb.	1885	.50
66	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881	.30	1,288,000	July	1884	.10
67	La Plata, S. L	Colo.	2,000,000	200,000	10	*	....	....	....	610,000	Sept	1882	.30
68	Leadville, S. L	Colo.	4,000,000	400,000	10	*	....	....	....	370,000	July	1885	.05
69	Lexington, G. S	Mont	4,000,000	40,000	100	*	....	....	....	565,000	Jan.	1885	2.00
70	Little Chief, S. L	Colo.	10,000,000	200,000	50	*	....	....	....	780,000	Mch	1885	.10
71	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*	....	....	....	1,050,000	Mch	1880	.50
72	Manhattan, S	Nev.	5,000,000	50,000	100	150,000	July	1879	1.00	412,500	Aug	1885	.25
73	Marguerite, G	Cal..	500,000	25,000	20	....	....	....	....	18,750	Oct.	1882	.25
74	Martin White, S	Nev..	10,000,000	100,000	100	1,125,000	Aug.	1885	.25	90,000	July	1879	.30
75	Minas Nuevas, S	Mex.	300,000	100,000	3	*	....	....	....	20,000	July	1883	.10
76	Morning Star, S. L	Colo.	1,000,000	100,000	10	....	....	....	....	525,000	July	1884	.25
77	Moulton, S. C	Mont	2,000,000	400,000	5	*	....	....	....	140,000	Apl.	1885	.07½
78	Mount Pleasant, G	Cal.	150,000	150,000	1	*	....	....	....	105,000	Mar.	1884	.10
79	Mt. Diablo, S	Nev	5,000,000	50,000	100	137,500	Jun.	1880	2.00	80,000	July	1885	.20
80	Napa, Q	Cal..	700,000	100,000	7	....	....	....	....	290,000	Jan.	1883	.10
81	Navajo, G. S	Nev..	10,000,000	100,000	100	390,000	Sept	1885	.30	325,000	Feb.	1885	.25
82	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*	....	....	....	7,500	May.	1885	.06½
83	New York Hill, G	Cal..	5,000,000	50,000	100	55,000	Mch	1878	.20	215,000	Aug.	1882	.10
84	New York & Colo., G	Colo.	1,250,000	50,000	25	....	....	....	....	25,000	July	1879	.10
85	Northern Belle, S	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.50	2,400,000	Apl.	1883	50
86	North Belle Isle, S	Nev..	10,000,000	100,000	100	115,000	Aug	1885	.10	33,000	Aug.	1881	.15
87	Ontario, S. L	Utah	15,000,000	150,000	100	....	....	....	....	6,650,000	Aug.	1885	.50
88	Ophir, G. S	Nev..	10,000,000	100,000	100	3,902,800	Feb.	1885	50	1,595,000	July	1882	1.00
89	Original, S. C	Mont	1,500,000	60,000	25	*	....	....	....	114,000	Oct..	1884	.05
90	Osceola, C	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	972,500	Sept	1884	25
91	Oxford, G	N. S.	125,000	125,000	1	*	....	....	....	36,000	Apl.	1884	.05
92	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	47,000	Mar.	1882	.15	50,000	Oct..	1884	.10
93	Pleasant Valley, G. S.	Cal..	10,000,000	100,000	100	40,000	Mar.	1884	.10	30,000	Dec.	1882	.05
94	Plymouth Con., G	Cal..	5,300,000	100,000	50	*	....	....	....	1,400 000	Aug.	1885	.50
95	Prussian, S. L	Colo	1,500,000	150,000	10	....	....	....	....	132,000	Jan.	1883	.10
96	Quicksilver, pref., Q	Cal..	4,300,000	43,000	100	....	....	....	....	666,000	Feb.	1884	.30
97	" com., Q	Cal.	5,700,000	57,000	100	....	....	....	....	151,000	July	1882	.40
98	Quincy, C	Mich	1,000,000	40,000	25	200,000	Dec.	1862	....	4,270,000	July	1885	2.00
99	Richmond, S. L	Nev..	1,350,000	54,000	25	*	....	....	....	4,110,587	Aug.	1884	1.25
100	Rising Sun, S	Dak..	750,000	150,000	5	*	....	....	....	52,000	May	1881	.07½
101	Robinson Con., S. L	Colo.	10,000,000	200,000	50	....	....	....	....	575,000	Nov.	1881	.50
102	Robert E. Lee, S. L	Colo.	5,000,000	500,000	10	....	....	....	....	100,000	Dec.	1882	.10
103	Rooks, G	Vt.	500,000	50,000	10	*	....	....	....	61,000	Apr	1885	.30
104	San Francisco, C	Cal..	5,000,000	50,000	100	45,000	Sept	1880	.50	20,000	Feb.	1885	.05
105	Savage, S	Nev..	11,200,000	112,000	100	5,988,000	Jun.	1885	.50	4,460,000	July	1869	3.00
106	Security L. Mg, Mfg.	Colo.	1,000,000	100,000	10	*	....	....	....	50,000	July	1884	....
107	Shoshone, G	Idah.	150,000	150,000	1	....	....	....	....	7,500	Apl.	1883	.01
108	Sierra Buttes, G	Cal..	225,000	22,500	10	....	....	....	....	1,450,933	Apl.	1885	.25
109	Sierra Bella, S	N. M.	1,000,000	200,000	5	....	....	....	....	30,000	May	1884	.15
110	Sierra Grande, S	N. M.	2,000,000	400,000	5	....	....	....	....	860,000	Sept	1884	.25
111	Sierra Nevada, G. S	Nev..	10,000,000	100,000	100	5,872,698	Jun.	1885	.25	102,000	Jan.	1871	1.00
112	Silver Cord, G. S. L	Colo.	5,000,000	500,000	10	....	....	....	....	225,000	Nov	1883	.25
113	Silver King, S	Ariz.	10,000,000	100,000	100	....	....	....	....	1,475,000	Sept	1885	.25
114	Small Hopes, Cons., S	Colo.	5,000,000	250,000	20	*	....	....	....	1,437,500	Aug.	1885	20
115	Smuggler, S. L	Colo.	600,000	60,000	10	....	....	....	....	66,700	Aug.	1883	25
116	Socorro, C	N. M.	250,000	2,500	100	....	....	....	....	4,000	Mch	1882	.00¾
117	South Yuba, G	Cal..	2,000,000	40,000	50	*	....	....	....	150,000	Oct.	1881	.75
118	Spring Valley, G	Cal..	200,000	200,000	1	*	....	....	....	50,000	Jan.	1881	25
119	Standard, G. S	Cal..	10 000,000	100,000	100	....	....	....	....	4,400,000	Mar.	1884	25
120	Stormont, S	Utah	200,000	200,000	1	*	....	....	....	155,000	Nov.	1881	.05
121	St. Joseph, L	Mo..	1,000,000	100,000	10	*	....	....	....	450,000	Jun.	1885	.20
122	Syndicate, G	Cal..	10,000,000	100,000	100	....	July	1882	.15	80,000	Sept	1885	.10
123	Tip Top, S	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
124	Tombstone, G. S	Ariz	12,500,000	500,000	25	....	....	....	....	1,250,000	Apl.	1882	.10
125	True Fissure, G. S. L	Utah	1,500,000	150,000	10	*	....	....	....	75,000	Jun.	1883	.15
126	United Gregory, G	Colo.	300,000	300,000	1	....	....	....	....	42 000	Apl.	1883	.25
127	United Verde, C	Ariz.	3,000,000	300,000	10	*	....	....	....	97,500	Feb.	1884	.20
128	Valencia, M	N. H.	150,000	1,500	100	*	....	....	....	18,750	Apl.	1885	2.50
129	Vizina, S	Ariz.	5,000,000	200,000	25	*	....	....	....	140,000	Apl.	1882	.10
130	Yellow Jacket, G. S	Nev..	12,000,000	120,000	100	5,358,000	Feb.	1882	1.00	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied to date.	Assessments. Date and amount per share of last.		
1	Albion, S. L	Nev..	$15,000,000	150,000	$100	$577,000	July	1883	.50
2	Allouez, C	Mich	2,000,000	80,000	25	240,000	Feb.	1884	.50
3	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	415,000	Jan.	1885	.50
4	Alta, S	Nev..	10,080,000	100,800	100	1,926,200	Apl.	1885	.25
5	American Flag, S	Colo.	1,250,000	125,000	10	300,000	Jun.	1877	.25
6	Barcelona, G	Nev..	5,000,000	200,000	25	*	....	....	....
7	Battle Creek, G	Dak.	5,000,000	200,000	25	....	....	....	....
8	Bear Creek	Cal..	300,000	300,000	1	....	....	....	....
9	Beauce	N. S.	....	....	....	....	....	....	....
10	Bechtel Con., G	Cal..	10,000,000	100,000	100	173,500	n.	1882	.10
11	Belvidere	Cal..	....	60,000	....	92,000	b.	1882	.15
12	Belmont, S	Nev..	5,000,000	50,000	100	....	Feb.	1885	.25
13	Best & Belcher, G. S.	Nev..	10,080,000	100,800	100	1,597,390	Jun.	1885	.50
14	Big Pittsburg, S. L	Colo.	20,000,000	200,000	100	*	....	....	....
15	Black Jack, G	Cal..	250,000	100,000	2½	....	....	....	....
16	Bonanza Chief	Mon.	1,000,000	1,000,000	1	*	....	....	....
17	Bondholder	Colo.	500,000	200,000	2½	....	....	....	....
18	Boston Con., G	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
19	Boulder Con	Colo.	....	....	....	....	....	....	....
20	Bradshaw, S	Ariz.	2,250,000	225,000	10	....	....	....	....
21	Buckeye	Colo.	2,000,000	400,000	5	*	....	....	....
22	" preferred	Colo.	....	....	....	....	....	....	....
23	Bull Domingo, S. L	Colo.	10,000,000	200,000	50	*	....	....	....
24	Bullion, G. S	Nev..	10,000,000	100,000	100	4,570,000	July	1885	.25
25	Bye and Bye	Ariz.	1,000,000	100,000	10	*	....	....	....
26	Calaveras, G	Cal..	500,000	500,000	1	*	....	....	....
27	Cal. W'r & M. Co., G	Cal..	....	....	....	....	....	....	....
28	Caledonia, S. H., G	Dak.	10,000,000	100,000	100	505,000	May	1885	.15
29	Castle Creek, G	Idah.	....	....	....	....	....	....	....
30	Catskill, S. A	Nev..	1,500,000	300,000	5	....	....	....	....
31	Central Arizona, S	Ariz.	10,000,000	100,000	100	....	....	....	....
32	Chapparal	Cal..	....	....	....	....	....	....	....
33	Cherokee, G	Cal..	1,500,000	150,000	10	....	....	....	....
34	Chollar, S	Nev..	11,200,000	112,000	100	816,000	July	1885	.50
35	Climax	Colo.	....	....	....	....	....	....	....
36	Con. Cal & Va., G. S.	Nev..	21,600,000	216,000	100	108,000	Jan.	1885	.20
37	Con. Imperial, G. S.	Nev..	50,000,000	500,000	100	1,050,000	May	1885	10
38	Con. Pacific, G	Cal.	6,000,000	60,000	100	150,000	Mar	1883	.15
39	** Cop. Queen Cons, C.	Ariz.	1,400 000	140,000	10	....	....	....	....
40	Crescent, S. L	Colo.	3,000,000	300,000	10	*	....	....	....
41	Crocker, S	Ariz.	1o,000,000	100,000	100	25,000	Oct.	1884	.25
42	Crowell, G	N. C	500,000	500,000	1	....	....	....	....
43	Coxheath, C	N. S.	500,000	100,000	5	....	....	....	....
44	Dahlonega, G	Ga..	250,0 0	250,000	1	*	....	....	....
45	Dardanelles, G	Cal..	1,000,000	100,000	10	....	....	....	....
46	Decatur	Colo.	....	....	....	....	....	....	....
47	Deseret, G. S	Utah	500,000	50,000	10	*	....	....	....
48	Dunderberg, S	Colo.	1,500,000	150,000	10	*	....	....	....
49	Durango, G	Colo.	500,000	500,000	1	*	....	....	....
50	Elko Con., S	Nev..	....	....	....	....	Mar	1884	.15
51	Empire, S	Utah	10,000,000	100,000	100	....	....	....	....
52	Enterprise	Colo.	....	....	....	....	....	....	....
53	Eureka Tunnel, S. L	Nev..	10,000,000	100,000	100	*	....	....	....
54	Exchequer	Nev.	10,000,000	100,000	100	840,000	Sept	1885	.30
55	Globe Copper	Ariz.	....	....	....	....	....	....	....
56	Gold Placer, G	Colo.	5,000,000	200,000	25	*	....	....	....
57	Goodshaw, G	Cal..	10,000,000	100,000	100	204,314	Jan.	1884	.10
58	Grand Belt, C	Tex.	12,000,000	120,000	100	*	....	....	....
59	Granville, G	N. C.	300,000	300,000	1	*	....	....	....
60	Gregory-Bobtail, G	Colo.	550,000	550,000	1	....	....	....	....
61	Harlem M. & M. Co, G	Cal..	1,000,000	200,000	5	....	....	....	....
62	Head Center, S	Ariz.	5,000,000	200,000	25	170,000	Jan.	1884	.10
63	Hidalgo, S	Mex.	200,000	20,000	10	....	....	....	....
64	Hortense, S	Colo.	2,000,000	200,000	10	....	....	....	....
65	Julia Cons., G. S	Nev..	11,000,000	110,000	100	1,427,000	Apl.	1885	.10
66	Lacrosse, G	Colo.	1,000,000	100,000	10	*	....	....	....
67	Leviathan, S	Nev..	10,000,000	100,000	100	380,000	Sept	1882	.25
68	Lucerne, S	Colo.	5,000,000	500,000	10	*	....	....	....
69	Mammoth Bar., G	Cal..	10,000,000	100,000	100	71,000	Mar.	1884	.15
70	Mariposa pref., G	Cal..	5,000,000	50,000	100	1,687,500	Dec.	1881	....
71	" common, G	Cal..	10,000,000	100,000	100	1,975,000	Feb.	1883	.25
72	May Belle, G	Cal..	10,000,000	100,000	100	84,000	Dec	1881	.20
73	Mayflower, S	Nev..	1,000,000	100,000	100	60,000	Mar	1884	.15
74	Mexican, G. S	Nev.	10,000,000	100,800	100	2,490,160	Feb.	1885	.25
75	Michoacan Synd	Mex.	....	....	....	....	....	....	....
76	Miner Boy, G. S. L	Colo.	5,000,000	500,000	10	*	....	....	....
77	Miller	Nev	5,000,000	200,000	25	....	....	....	....
78	Mono, G	Cal	5,000,000	50,000	100	560,000	Jun.	1885	.50
79	Moose Silver, S	Colo.	3,000,000	300,000	10	*	....	....	....
80	Nevada Syndicate	....	....	....	....	....	....	....	....
81	New Pittsburg, S. L	Colo	2,000,000	200,000	10	*	....	....	....
82	North Standard, G	Cal..	10,000,000	100,000	100	20,000	Nov	....	....
83	Noonday	Cal..	600,000	60,000	10	208,000	Dec.	1881	.10
84	Old Dominion, C	Ariz.	3,000,000	300,000	10	....	....	....	....
85	Oriental	Nev..	2,000,000	200,000	10	....	....	....	....
86	Oriental & Miller, S	Nev..	10,000,000	400,000	25	....	....	....	....
87	Overman, G. S	Nev..	11,520,000	115,200	100	3,685,040	Apl.	1885	.20
88	Park, S	Utah	2,000,000	200,000	10	....	....	....	....
89	Peer, S	Ariz.	10,000,000	100,000	100	105,000	July	1885	.30
90	Peerless, S	Ariz.	10,000,000	100,000	100	180,000	Aug	1885	.50
91	Plutus, G. C. S. L	Colo	2,000,000	200,000	10	*	....	....	....
92	Potosi	Nev..	10,200,000	112,000	100	865,600	July	1885	.50
93	Quartz Creek	....	....	....	100	....	....	....	....
94	Rappahannock, G	Va	....	250,000	....	....	....	....	....
95	Red Elephant, S	Colo.	500,000	500,000	1	*	....	....	....
96	Resort M. & M. Co	Colo.	....	....	10	*	....	....	....
97	S.P. & Canon del A. C.	N.M.	10,000,000	400,000	25	....	....	....	....
98	Silver Cliff, S	Colo.	5,000,000	400,000	....	....	....	....	....
99	Sonora Con	Mex.	5,000,000	200,000	25	*	....	....	....
100	South Bodie, G	Cal.	....	....	....	....	....	....	....
101	South Bulwer, G	Cal..	10,000,000	100,000	100	....	....	Mar	1882
102	South Hite	Cal..	10,000,000	100,000	100	100,000	May	1881	.25
103	South Pacific	Cal..	....	100,000	5	195,000	Jan.	1883	.05
104	State Line, S	Nev..	250,000	250,000	1	....	....	....	....
105	Sullivan, G. S. L	Me...	500,000	100,000	5	....	....	....	....
106	Sutro Tunnel	Nev..	20,000,000	2,000,000	10	125,000	Dec.	1882	.25
107	Tamarack, C	Mich.	1,000,000	40,000	‡25	*	....	....	....
108	Taylor-Plumas, G	Cal..	1,000,000	200,000	5	520,000	Apl.	1885	3.00
109	Tioga Cons., G	Cal..	10,000,000	100,000	10	*	....	....	....
110	Todos Santos, S	Mex.	1,000,000	100,000	100	*	....	....	....
111	Tuscarora, S	Nev..	10,000,000	100,000	100	325,000	Oct.	1882	.10
112	Unadilla, S	Colo.	50,000,000	500,000	100	110,000	Oct.	1881	.15
113	Union Con., G S	Nev..	10,000,000	100,000	100	*	....	....	....
114	Utah, S	Nev..	2,000,000	20,000	100	2,010,000	Apl.	1885	.25
115	Vanderwater	Nev..	20,000,000	200,000	100	1,810,000	Dec.	1884	.50
116	Washington	Ariz.	2,000,000	200,000	10	*	....	....	....
117	Wellington, G	Nev..	100,000	50,000	2	....	....	....	....
118	Whalen Copper	Nev..	2,500,000	100,000	25	*	....	....	....

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to December 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood has previously paid $275,000 in eleven dividends, and the Terra $75,000. ‖ Previous to the consolidation of the California and Consolidated Virginia in August, 1881, the California had paid $31,320,000 in dividends, and the Consolidated Virginia $42,930,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid $1,350,000 in dividends.

NEW YORK MINING STOCKS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES.
	Sept. 5.		Sept. 7.		Sept. 8.		Sept. 9.		Sept. 10.		Sept. 11.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alice, Mon.					1.90				1.85				200
Amie Con., Co.	.06		.04		.05	.04	.65		.04				4,000
Argenta													
Bassick, Co.													
Belle Isle, Ne.													
Bodie Cons., Ca.	1.55				1.85						1.95		525
Bulwer, Ca.					.40				.38	.35			1,300
California, Ne.													
Cal. & Hecla, Mich.													
Castle Creek													
Catalpa													
Chrysolite, Co.	.80				.81	.80							1,000
Colorado Central	1.00								1.20				136
Cons. Cal. & Va., Ne.	1.75	1.70	1.80		1.85		1.75	1.65	1.80	1.75	1.80	1.60	4,300
Crown Point													
Dunkin, Co.													
Eureka Cons., Ne.					5.00								50
Father de Smet, Dk.							5.00	4.90	5.00				600
Franklin													
Gold Stripe, Ca.													
Gould & Curry, Ne.													
Grand Prize, Ne.													
Green Mountain, Ca.													
Hale & Norcross, Ne.					6.00				5.38		5.00		400
Hall-Anderson, N. S.													
Homestake, Dk.					17.00								10
Horn-Silver, Ut.	2.15		2.20		2.15		2.25	2.15	2.30		2.25		5,600
Independence, Ne.											.02	.01	300
Iron Silver, Co.									1.10				100
Leadville C., Co.			.35								.35	.34	500
Little Chief, Co.													
Little Pittsburg, Co.									.20		.23	.22	400
Martin White, Ne.													
Moulton									1.35	1.25			900
Navajo, Ne.	.60								.70		.85		620
North Belle Isle, Ne.													
Ontario, Ut.													
Osceola													
Plymouth			18.00		18.00								80
Quicksilver Pref., Ca.							23.00						100
" Com., Ca.													
Quincy													
Robinson Cons., Co.			.45										100
Savage, Ne.			2.50						2.40		2.00		325
Sierra Nevada, Ne.													
Silver King, Ar.													
Spring Valley, Ca.													
Standard, Ca.	1.15				1.20	1.15			1.20	1.10			1,100
Stormont, Ut.					.09								400
Tip Top, Ar.													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE.												SALES
	Sept. 5.		Sept. 7.		Sept. 8.		Sept. 9.		Sept. 10.		Sept. 11.		
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez													
Alta			.35		.35		.35						1,700
American Flag													
Barcelona, G.													
Bechtel Con., G.													
Belvidere													
Belcher													
Best & B'lcher, G. S.											1.90		450
Big Pittsburg, S. L.											1.75	1.70	
Bowman Silver													
Bull-Domingo, S.L.													
Cal., B. H., G.	1.85		1.80				1.90				2.10	2.00	1,600
Central Ariz'na, S.							.16						300
Chollar													
Cons. Imperial													
Con. Pacific													
Cusi													
Decatur													
Durango, G.													
Eastern Oregon													
Goodshaw, G.													
Harlem M. & M. Co.													
Hershaw													
Kossuth													
Lacrosse, G.							.10		.10				400
Mariposa Pref., G.													
" Com., G.													
Mexican, G. S.													
Mono													
New Pittsburg													
Noonday													
North Standard, G.													
N. Horn-Silv'r, S L.													
Pri'nt'l & Miller, S			.10		.09								4,400
Potosi			.07		.07								1,500
Rappahannock G													
Red Elephant, S.													
Ridge													
Silver Cliff, S.													
Sonora Con.													
South Bodie, G.													
South Bulwer, G.													
South Hite													
South Pacific													
State Line, 1 & 4, S.													
" Nos. 2 & 3, S.													
Sutro Tunnel			.17		.18	.17	.17		.17		.17		11,600
Tamarack													
Tioga													
Unadilla, S													
Union Cons., G. S.									.68		.75		300
Utah													

Dividend shares sold, 23,046. Non-dividend shares sold, 22,250.

when fixed charges are considered, a reduction of ten cents a ton on the price of coal becomes a serious matter, increasing the losses of the companies from $2,500,000 to $3,000,000 a year. This, however, is insignificant, compared with the prospects as indicated by recent reductions of prices, and the actions of the managers of the companies on other matters. The situation appears to be simply this: The companies propose to mine all the coal that the market and the stocking facilities will take. At least, one company seems determined to sell all the coal it can mine at the best prices it can obtain. The other companies, while not aggressive, promptly although reluctantly put down their prices to meet those of the prime disturber of the market. It is very evident that this is bound to so disturb buyers that the only way to sell a large quantity of coal will be by auction, and, therefore, the rumors of coming auction sales, which do not as yet appear to bear official authenticity, are not so unreasonable as many might expect. With auction sales once started, there will probably be a period of as low prices as the trade has ever seen.

The feeling is already very strong that there will not be a combination next year. There are many who are heartily glad of this. In fact, it does not seem possible to draw up a programme that has not already been tried and condemned, excepting Mr. Gowen's plan of pooling the whole production and selling it through one sales department. Although this plan possesses great merit, it is entirely impracticable under the embarrassed financial conditions of some of the companies.

Lackawanna's average prices on actual sales, during August, are reported at $3.08½ a ton, a falling off of 14 cents, as compared with July, and 48½ cents, as compared with August last year.

There is hardly such a thing as prices. Lehigh Chestnut at $2.75@$2.80 seems to be in abundance, while other coal is not far from it. The Philadelphia *Press* announces the sale of 12,000 tons of coal at 80 cents under circular price, and the New York *Tribune* is authority for the statement that 15 boat-loads of Chestnut coal have been sold at a price equal to $2.35 f. o. b.

The Lehigh Valley Railroad Company has reduced its dividend to four per cent. per annum. This, coupled with the statement that there is a strong feeling in the management against standing any more o Mr. Sloan's "nonsense," whether it be due to stock deals, eccentricity, or whatsoever other cause, does not look well for the trade. It will be remembered that this company was the first openly to express its disgust with the combination that terminated in 1876. It was criticised for selling to the elevated railroads broken coal at a low figure late last year. That sale, however, has proved to be not unwise. There are evidences that the company will again be heard from with low prices late this year, if not earlier. In fact, it is stated that some offers or sales have stipulated for lower prices in November and December.

Bituminous.

Prices are as low as they have been at any time, while the demand, which was expected to improve under better conditions in manufacturing circles, is no better than it has been for a long time past. There has been some scarcity of cars on the Pennsylvania Railroad. Vessel rates are very low. We learn of a vessel chartered at Baltimore for Providence at 90 cents a ton.

Buffalo. Sept. 10.

[From our Special Correspondent.]

The anthracite coal trade has greatly improved since the beginning of the month. One dealer assured me that his sales thus far this month exceeded the whole of the orders received by him during August, as well as those received in July. Another said: "The outlook is very good; the demand is steadily increasing; orders are coming in quite freely from interior points and along the lines of railroads centering here." Generally, dealers think that the dull times have passed, that a good fall and winter trade may be calculated on, and that the indications may be relied upon as being conservatively encouraging.

The bituminous coal trade is, without doubt, slightly on the mend. Prices are still very low; but the outlook is bright and hopeful. Rates are cut as low as possible. Manufacturers report a fairly increasing demand for all kinds of goods, and consequently more workmen will be employed and more machinery set in motion. This means increased consumption of fuel.

The contract for the supply of bituminous coal to the revenue cutters on the lakes has been awarded. No price is named and no parties are mentioned. The only item in reference to it was that, "the price paid was satisfactory."

The coke trade is without any new features; a fair business is done.

There was a good demand for vessels at the end of last week and at the beginning of this. Many charters were made, and the stocks of coal were pretty well exhausted on Tuesday, when a large fleet arrived. "Vessels are thicker than mosquitoes," said a Delaware, Lackawanna & Western man. Freights are demoralized, and shipments were made at 10 cents decline to Milwaukee and Lake Superior ports. This showed the effect of "surplus tonnage." Later, vessel men are firmer, and say that, as coal was scarce for Lake Superior ports, and as four or five grain vessels had contracted for return freight, they took the 10 cents less for those points, and only one charter was made to Milwaukee at the 10 cent decline.

The shipments of coal by lake from Buffalo, from September 3d to 9th, both days inclusive, were 59,140 tons; namely, 14,290 to Chicago, 19,600 to Milwaukee, 200 to Chatham, 650 to Sheboygan, 450 to East Saginaw, 8050 to Duluth, 2230 to Toledo, 2350 to Detroit, 2400 to Racine, 4200 to Superior, 400 to St. Clair, 460 to Windsor, 3260 to Washburn. The freight engagements were at the following rates: 50c. to Chicago; 50@40c. to Milwaukee; 40@30c. to Duluth; 15c. to Detroit and Toledo; 20c. to East Saginaw; 55@50c. to Racine; 40c. to Washburn; 15c. to Windsor; 25c. to St. Clair; 40@30c. to Superior; 55c. to Sheboygan; 25c. to Chatham; 50c. to Green Bay; 55c. to Manitowoc; 50c. to Marquette and Sault Ste. Marie; closing inactive, as shippers found it difficult to get sufficient coal from the mines to handle boats already chartered.

The canal shipments of coal for the past week were as follows: One boat-load to Troy at 75c. per gross ton, free in and out; one boat-load to Schenectady at 87½c. per net ton, captain to pay loading and unloading. The nominal asking rates are as follows: To New York, $1.25 net ton, captain to pay loading and unloading; to Syracuse, 60c. gross ton, captain to pay unloading only; and to Albany, 75c. gross ton, free in and out. The canal business is generally sadly demoralized by low freights and light movement.

Messrs. Frank Williams & Co., the well-known coal miners and dealers of this port, have constructed a transfer elevator, whereby grain can be handled very cheaply. It is really the old bucket system revived There is trouble in the camp, however; for the elevator is practically boycotted, for the reason that the Western Elevating Company is reported as saying, "If any grain receiver in Buffalo dares give it a cargo, the

company will refuse to handle his cargoes in future." Williams & Co. intend soliciting consignments directly to them, as they believe that there are shippers who are not above saving half a cent a bushel on the Buffalo transfer, if they can do so by merely consigning cargoes to the new elevator.

The new corporation known as Hall's Composite Ship Company, with a capital stock of $100,000, is in process of formation at Chicago, for the construction of a new freighting steamer according to the methods and plans of "Hall's patent" in the United States. I wonder whether this will affect coal freights. I wrote you some months since that a plan had been promulgated with reference to the cheapening of freights through the agency of lines of steam colliers built of steel, which would combine economy of construction with large capacity and quick dispatch; but I can not ascertain whether this is the outcome or not.

The following statement, compiled from Custom-House records and newspaper files, shows the shipments of coal from Buffalo, with points of destination, from the opening of navigation to September 1st, 1885:

Name of port.	Tons.	Name of port.	Tons
Chicago	377,670	Mackinaw	650
Depere	1,030	Sandusky	9,520
Duluth	75,320	Kelly Island	520
Escanaba	2,080	Green Bay	16,800
Lake Linden	500	Manitowoc	2,850
S. Ste. Marie	530	Hancock	3,630
Toledo	30,340	Kenosha	2,200
Windsor	1,020	Detroit	13,780
Kincardine	1,050	Washburn, L. S.	4,760
Ashland	1,450	Bay City	300
Saginaw	3,550	Racine	15,920
Menominee	600	Superior City	39,100
Marine City	400	Sheboygan	3,300
Marquette	13,780	Portage	1,900
Port Huron	390	Milwaukee	216,850
Port Arthur	1,400	Miscellane's, unaccounted for	27,440
Muskegon	1,830		

Note.—Whether anthracite or bituminous coal, is not specified in the manifests.

The receipts of coal at Duluth for the week ended September 5th were 24,617 tons.

The Pioneer Fuel Company, at Duluth, is the receiver of the Lehigh Cross Creek coal mined by the Coxe Brothers.

Boston. Sept. 10.

[From our Special Correspondent.]

We have had a little cool weather, and it has shown us that there will be considerable demand for anthracite if we have cool weather at hand, even though the buying be in small lots. In the present state of affairs, very much depends on the weather. Should September and October prove to be milder than usual, there will be trouble for the companies. The combination is felt to have little or no influence in the conduct of the trade now. The only prudent course for the retailer is to buy cautiously. If matters were not in this unsettled condition, trade would naturally be more active during this month. Freights generally begin to advance about this time. F. o. b. prices remain nominally unchanged.

The movement in bituminous coal is not large; but the impression prevails that more single cargoes are sold in this market than is usual at this time of year. In the matter of the Water Board contract for 2500 tons, as noted last week, the lowest bid of $2.99 by the Beech Creek people was accepted. The contract called for "Cumberland coal or its equal," it will be remembered; but that is doubtless come to be considered a mere form with the city of Boston, and the price was too low to be passed by. F. o. b. prices for bituminous continue at $2.25@$2.35.

The receipts of domestic coal at this port scarcely more than hold their own, as compared with last year. The total receipts for eight months, from January 1st to September 1st, have been 1,436,134 tons, which is only 465 tons more than was received in the same period of 1884. During the month of August, there has been a falling off, as compared with last year, of almost 30,000 tons. The greatest falling off is noticeable in receipts from Philadelphia, they having been 44,336 tons less than in the first seven months of 1884. Boston's receipts from Baltimore during the same period have also fallen off 21,865 tons.

New York has held its own and a little more in the matter of shipments to Boston, showing a gain of 3300 tons; while Newport News, Richmond, Norfolk, and all minor ports shipping bituminous coal to Boston have thus far increased last year's record by 63,530 tons.

There has been a little firmer feeling in freights, and lowest quotations are not readily obtained. We quote:

New York, 70@90c.; Philadelphia, 95c.@$1.05; Baltimore, $1.10@$1.15; Newport News, $1@$1.05; Richmond, $1.10@$1.15; Cape Breton, $1.40@$1.50; Bay of Fundy, $1.25.

We note a better retail trade. Dealers are fairly well stocked. Prices are nominally unaffected by the happenings in the wholesale market. We quote:

White ash, furnace and egg	$4.75@$5.00
" " stove and nut	5.25@ 5.50
Shamokin, egg	6.00
" stove	6.25
Lorberry, egg and stove	6.50@ 7.00
Franklin, egg and stove	7.25@ 7.75
Lehigh, furnace, egg, and stove	5.25@ 5.50
" nut	5.50@ 5.75

We quote wharf prices as follows: Stove, $4.50@$4.75; Broken and Egg, $4@$4.50.

COAL STOCKS.

NAME OF COMPANY.	Par value of shares.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share. Sept. 5. H.	Sept. 5. L.	Sept. 7. H.	Sept. 7. L.	Sept. 8. H.	Sept. 8. L.	Sept. 9. H.	Sept. 9. L.	Sept. 10. H.	Sept. 10. L.	Sept. 11. H.	Sept. 11. L.	Sales from Sept. 5th to Sept. 11th, inclusive.
Barclay Coal														
Cameron Coal	50													
Col. C & I	10	15¾		15⅝		16¾	16	17	16	17	16	17	16¼	4,045
Ches. & O. RR.	100	7⅞				7⅞	7⅝	7¾	7½	7		7⅛		695
Consol. Coal	100													
Cumb. C. & I.	100													
Del. & H. C.	100	84⅜	84⅛	83¼	79½	80½	79¼	82⅛	81¼	81	80¼	81¼	80⅜	7,407
D., L. & W. RR.	50	101	100⅜	100¾	98	98⅞	97	99¾	98	99¼	98⅛	98⅞	97⅜	259,140
Elk Lick Coal Co														
Lehigh C. & N.	50	43	42⅞	42¼		42	40½	41¾	41	41⅞	41½			1,765
Lehigh Valley RR.	50	57¼		57⅛		57¼	54½	55	54⅝	54¾	54½			2,498
L. & W. C. & I Co.														
Maryland Coal	100													
Montauk Coal	100													
Morris & Essex	50			126										100
New Central Coal	100			7						7				300
N. J. C. RR.	100	47¼	44	45	40⅞	41⅞	40	42½	41	41¼	39½	40½	39⅜	73,946
N. Y. & S. Coal	50													
Penn. Coal	50													
Penn. RR.	50	50¼	50⅛	50¼	49⅞	50¼	49¾	50¼	50	50	48⅞			17,946
Ph. & R. RR.*	*50	18¼	17	17⅜	16⅝	17¾	16¾	18½	18	18	17	17¼	16⅞	33,580
Spring Mountain	50													
Westmoreland Coal	50													

* Of the sales of this stock, 22,560 shares were in Philadelphia and 11,020 in New York. Total sales, 401,422.

FINANCIAL.

Mining Stocks.

NEW YORK, Friday Evening, Sept. 11.

Business was dull in the mining market this week, and while the dealings were generally scattered over the list, the transactions were light and confined to a small number of shares. There is no special feature to report, and prices remain about the same. The total transactions were 45,296 shares, showing a decrease of 11,822 shares, as compared with those of the previous week.

Amie records a small business, and sold at from 6@4c. Chrysolite was quiet and steady, at from 80@81c. Leadville sold at from 35@34c., with a small business. Little Pittsburgh ranged from 20@23c. Standard sold fairly, but was a little weak, being quoted at from $1.20@$1.10. Bodie was moderately dealt in at strong prices, selling at from $1.55@$1.95.

Quite a little business has been done in Horn-Silver at strong prices; the transactions reached 5600 shares, selling at from $2.15@$2.30@$2.25. Stormont sold at 9c., with small transactions.

The Comstocks show but a fair business, with prices still on the decline. Consolidated California & Virginia was fairly dealt in, but was weak; it sold at from $1.85@$1.60. Hale & Norcross declined from $6@$5, under a small business. Savage was also weak, selling at from $2.50@$2, with small transactions. Alta was quiet and steady at 35c.

Caledonia was a feature of the market on account of its strength; it rallied from $1.80@$2.10, closing at $2, with sales of 1600 shares. Plymouth was quiet and strong, at $18. There were some small dealings in Colorado Central at $1.20; the price asked is $1.30, with $1.25 bid at the close. The statement of the company shows a balance in bank at present of $72,467.28.

Coal Stocks.

The general stock market has been weak under discouraging developments in the railroad world. Trunk line rates are lower than ever known, while serious trouble seems to have reached nearly all the systems, or appears to be impending. A break in the coal stocks, which we intimated as probable, came; but a still more important one is looked for. It is thought that a majority of the directors of Lackawanna were under obligations to S. V. White to continue paying an 8 per cent dividend up to July 1st; but that obligation no longer exists. The indications are, that there will be a reduction of the next dividend, to be announced on the 25th inst. A good authority in the Board says it will be 1½ per cent for the quarter. It may, however, be a compromise at 1¾. It is hardly probable that Mr. Sloan would urge so unpopular a measure as a 2 per cent dividend, when it is a very serious question whether the company would show any earnings under an honest system of bookkeeping. A reduction of the Lehigh Valley Railroad Company's dividend to 4 per cent per annum has had an alarming effect upon holders of coal securities. There has not been a large amount of stock thrown over yet, but there is likely to be soon, unless a very great change for the better comes in the coal situation. The cliques in the coal shares have stood by the stocks very well.

Jersey Central, which was put up on wind, with the expectation of getting the public to buy the stock by issuing all sorts of false and ridiculous stories, led the break. It has ranged between $47¼@$39⅜, and closed at $40¼. Lackawanna sold at $101@$97, and closed at $98⅛. Delaware & Hudson ranged between $84⅜ and $79¼, and closed at $80¼. Reading sold at $18¼@$16¾, and closed at $17¼.

In Philadelphia, Pennsylvania Railroad declined to $48⅞. Lehigh Valley sold down to $54½, and Lehigh Coal and Navigation Company to $40½@$41½.

The market for the coal shares had a weak tendency at the close.

Meetings.

Meetings of the following companies will be held at the time mentioned:

Enterprise Mining Company, office of the company, Leadville, Colo., September 22d, at ten o'clock A.M., a special meeting for the purpose of electing a new board of directors, altering or amending the company's by-laws, providing means for the further development of the company's property, and transacting such other business as may regularly come before the meeting.

Wahsatch Iron and Coal Company, office of the company, No. 42 New street, New York, October 1st, at half-past three o'clock P.M.

Pipe Line Certificates.

Messrs. Watson & Gibson, petroleum brokers, No. 49 Broadway, report as follows for the week:

The oil market has been disturbed this week by reports from the field to the effect that the Gordon well at Washington and the Leidecker well, 8 miles ahead of developments in the Butler field, both promised to be large. Under the scare attending these rumors, prices broke to 98⅞c.@99c., and those who sold out were generally either timid ones or those who were carrying on light margins. The oil passed into stronger hands, and to-day the market rallied to $1.01⅝, closing to-night at $1.01. The United Pipe Line Branch of National Transit Company in its statement for August gives the reduction of stocks at 361,000 barrels, and so far this month, shipments have exceeded runs by 200,000. The refined market is firm. Barring really dangerous wells, the market is likely to go much higher.

The following table gives the quotations and sales at the Consolidated Stock and Petroleum Exchange:

	Opening.	Highest.	Lowest.	Closing.	Sales.
Sept. 5	$1.02⅝	$1 02½	$1 00¾	$1.01	5,485,000
7	1.01	1.01⅝	1 00⅞	1.01⅛	2.789 000
8	1.01⅛	1.02⅛	1.01⅛	1.01¾	5,354.000
9	1 01⅝	1.01⅞	1.00⅝	1.00¾	4,681,000
10	1.00⅝	1.01⅛	.98¾	1.00⅛	8.613,000
11	1.00⅝	1.01⅜	1 00¼	1.01	4.955,000
Total sales					31,877,000

San Francisco Mining Stock Quotations.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Sept. 4.	Sept. 5.	Sept. 7.	Sept. 8.	Sept. 9.	Sept. 10.
Albion						
Alpha						
Alta	.30	.30	.30	.25		.30
Argenta						
Bechtel						
Belcher	1.00		.90			
Belle Isle						
Best & Belcher	2.12½	2.00	1.87½	1.75		1.62½
Bodie	1.62½		1.75	1.50		1.75
Bullion						
Bulwer						
Chollar	1.87½	1.75	1.75	1.50		1.50
Con. Pacific						
Con. Cal. & Va.	1.87½	1.75	1.75	1.75		1.75
Crown Point		1.12½	1.12½	1.00		
Day						
Elko Cons						
Eureka Cons						5.50
Exchequer						
Gould & Curry	1.37½		1.25	1.12½		1.12½
Grand Prize						
Hale & Norcross	6.25	5.87½	6.00	4.87½		4.75
Independence						
Martin White						
Mexican	1.00	.95	.90	.85		.75
Mono						
Mount Diablo			2.75	2.75		
Navajo	.65	.65	.75	.75		.80
Northern Belle						
North Belle Isle						
Ophir	1.37½	1.25	1 25	1.12½		1.12½
Overman						
Potosi	.85	.80	.75	.65		.60
Savage	2.87½	2.75	2.75	2.25		2.12½
Scorpion						
Sierra Nevada	1.50	1.50	1 50	1.25		1.12½
Silver King						
Tip-Top						
Union Cons	.85	.75	.80	.70		.65
Utah						
Wales Cons						
Yellow Jacket		2.12½	2.12½	2.00		1.87½

Boston Copper and Silver Stocks.

[From our Special Correspondent.]

BOSTON, Sept. 10.

The market for copper stocks has been fairly active the past week, and prices generally have ruled better; but dealings are confined entirely to the dividend and prospective dividend-paying mines, and there is but little disposition to operate in the speculative list at present. Calumet & Hecla was a little heavy, and, after selling at $217½, declined to $215 for one share, but subsequently recovered to $217, and closed to-day $216 bid; sales, 52 shares. Tamarack was more in demand, and advanced from $62½@$69, the latter price being touched to-day, closing strong at $69 bid, $70 asked. The holders of this stock evidently believe in it, and are not disposed to part with it at present prices. The reports continue to be of an encouraging nature, and it is thought by good judges that the mine will eventually prove a formidable competitor to the Calumet & Hecla. Sales, 257 shares. Quincy improved from $36½@$37 on sales of 40 shares only, but was offered at $37 at the close. Franklin opened firm at $8¾, at which 100 shares were taken; but later declined to $8½. A lot of 5 shares sold to-day at $8, but $8¼ was bid for round lots, and none offered; sales, 250 shares. Osceola declined from $13@$12½, but quickly recovered to $13, and is in good demand at this price; about 75 shares were sold this week. Total sales for the week, 675 shares.

In silver stocks, there was nothing doing at the Boston Stock Exchange, and at the Mining Board there was very little activity. Sales of Bowman Silver at 7@6c. Dunkin, 18@19c. "Cusi," $1.05. Catalpa declined to 25c. Bonanza Development, to $1. Miscellaneous stocks, dull and neglected.

3 P.M.—There was no activity at the afternoon Board. A sale of 5 shares Osceola at $12½ comprised all the business in mining stocks. Closing prices: Allouez, 50c. bid, 60c. asked. Atlantic, $7½ bid. Calumet & Hecla, $215 bid, $217 asked. Franklin, $8 bid, $8½ asked. Osceola, $12½ bid, $13 asked. Pewabic, $½ bid. Quincy, $36 bid, $37 asked. Tamarack, $65 bid, $70 asked.

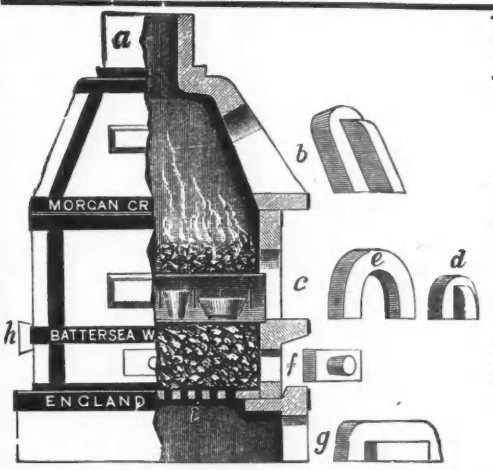
HORN-SILVER MINING COMPANY OF FRISCO, UTAH.

OFFICE, 44 WALL STREET, NEW YORK.

The annual meeting of stockholders of the Horn-Silver Mining Company will be held in Frisco, Utah, on TUESDAY, the 6 h day of October, at 12 o'clock, at the office of the company.

Transfer-books will close on Monday, September 7th, and reopen September 12th

W. S. HOYT, Secy.



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BATTERSEA WORKS,

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FURNACES,

MUFFLES,

CRUCIBLES,

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LEONARD RICHARDS, Agt.,

24 Whitehall St., New York.

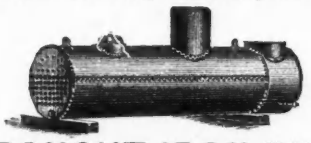
UNITED STATES ASSAY OFFICE, 30 WALL STREET, NEW YORK, Nov. 27, 1882.

SIRS: During the past two years, we have used large numbers of the "G" Crucibles, made by the Morgan Crucible Company, and find they are well suited for the assayer; requiring no annealing, and withstanding the action of fluxes. In point of smoothness, they are far superior to the Hessian crucible.

Yours respectfully, TORREY & EATON, Assayers.

R. J. BUCHANAN,

215 17th Street, Denver, Colo.,



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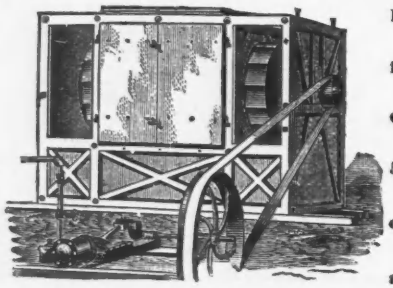

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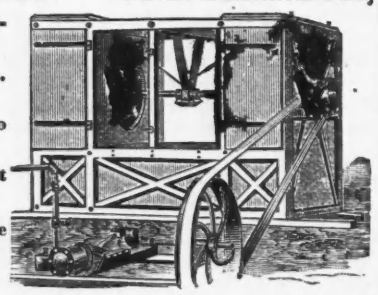

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